CHNOLOGY DEPT.

the OIL AND GAS JOURNAL

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There is a difference!

REED
Liquid-blast
ROCK BITS

. . . clean the bottom of
the hole as they drill,
assuring faster penetration
and more hole per bit.

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

PRICE 50 CENTS TABLE OF CONTENTS PAGE 45 JULY 20, 1950

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HOWCO
"know-how"
PRODUCES
BETTER TOOLS FOR
BETTER CEMENTING
HOWCO DM-DC SQUEEZE PACKERS
These remarkable tools are products of many years' research and experience. They were given every conceivable test in actual performance before being offered to the oil production industry. They were designed and built for and by *experienced oil well cementers.* That's why, like all other HOWCO tools, they're doing a better cementing job . . . *better!*
The DM (drillable magnesium alloy) and the DC (drillable cast iron) are identical except for the metal. Both are built to function efficiently in deep wells under high pressures. All valve and slip actions are simple, timely and positive.
Your HOWCO representative can give you 13 outstanding reasons why the HOWCO DM and DC SQUEEZE PACKERS will do your job *better* . . . Call him today!
"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"
HALLIBURTON OIL WELL CEMENTING CO.
DUNCAN, OKLAHOMA
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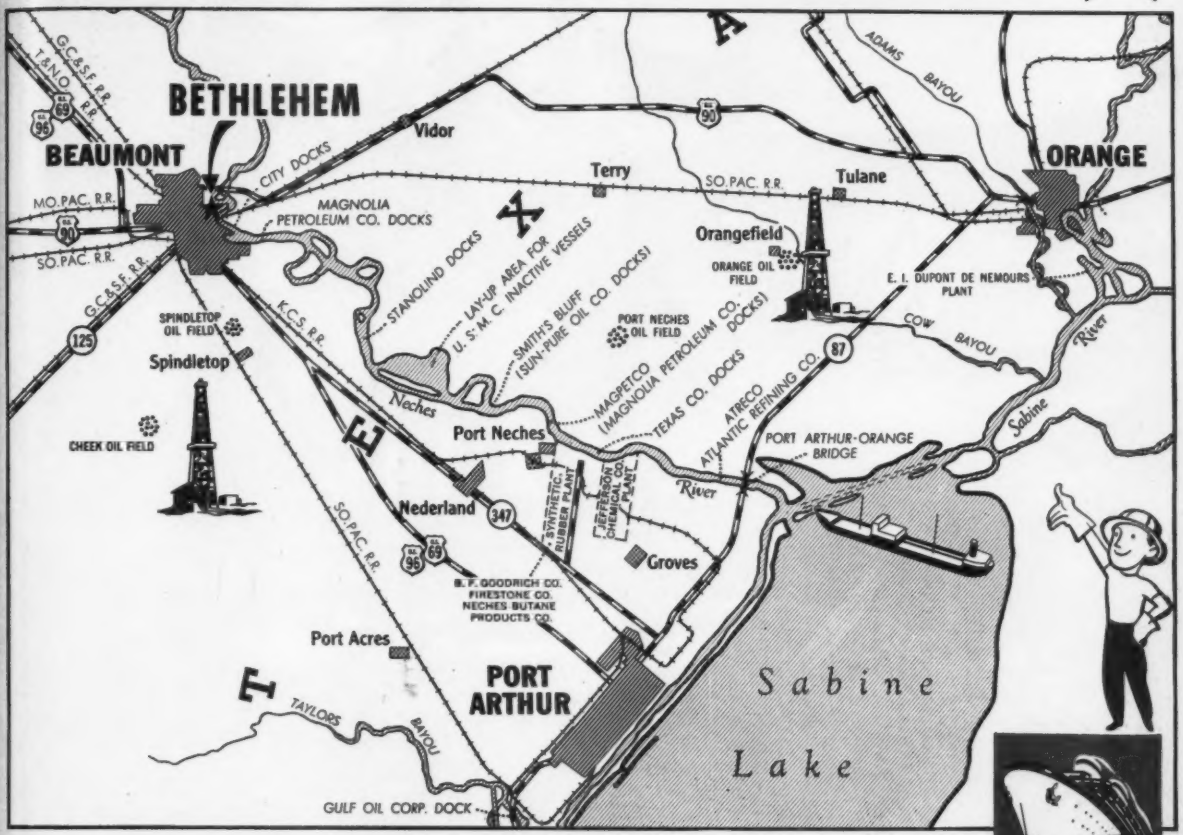
Bethlehem at Beaumont



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Bethlehem's Beaumont Yard offers to the petroleum and allied industries *ashore and afloat* an unsurpassed range of products and services.

NEW CONSTRUCTION—Drilling Barges, completely equipped from hull bottom to gin pole; Oil, Water, Ore and Derrick Barges; Integrated Tows; Acid Carriers; Lighters; Scows; Car Floats; Harbor, River and Ocean-going Craft of all types.

REPAIR and CONVERSION—Tug Boats to T-2 Tankers and C-4 Cargo ships, including highly-specialized craft such as Liquefied Petroleum Gas and Bulk Liquid Chemical Cargo Carriers.

FABRICATION—Offshore Drilling Platforms; Storage Tanks, welded or riveted; Surge Tanks; Bubble Towers; Distilling Units; Agitators; Separators; Pressure Vessels; Spheres; Underwater Tunnel Sections; Gas Transmission Lines; General Steel Fabrication.

INDUSTRIAL WORK—Repair, Reconditioning and Manufacture of Equipment for *Industry Ashore.*

For Dependable Products and Services for the Oil Industry *Ashore and Afloat*, always use Bethlehem.

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General Offices: 25 Broadway, New York 4, N. Y.

On the Pacific Coast shipbuilding and ship repairing are performed by the Shipbuilding Division of Bethlehem Pacific Coast Steel Corporation

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1950.

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WHITE-TAILED DEER

SPECIALISTS IN *Southwest* CONSTRUCTION

If your organization's plan includes capitalizing on the vast resources of the Southwest, it will be to your benefit to take advantage of Brown & Root's years of experience in this territory. A thorough understanding of the soil, terrain, and climatic conditions, plus the engineered solutions which Brown & Root has applied to other jobs, may result in faster and more economical completion of your contemplated project. A request from you will put Brown & Root consultants at your service.

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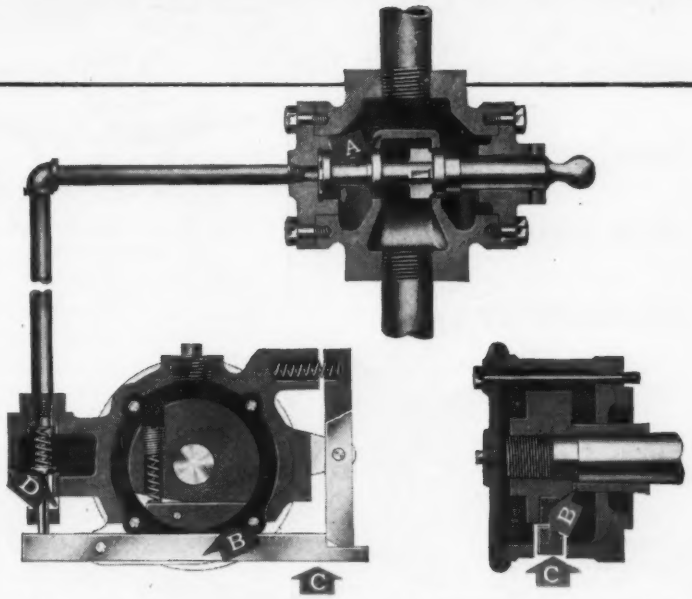
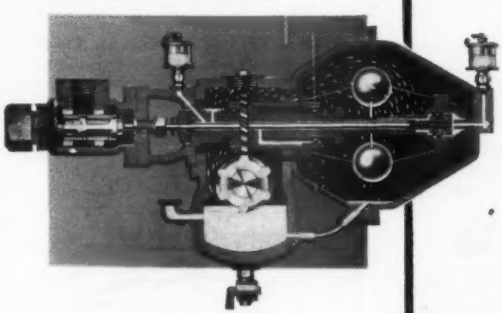
Only Coppus Turbines offer you *a pilot operated* excess speed safety trip



The constant speed governor on Coppus Turbines, plus this Excess Speed Safety Trip, gives you extra protection for your turbine investments. Here's how it works. When steam is turned on, pressure opens valve A fully. When excess speed is reached, centrifugal force throws weight B against lever C lifting pilot valve D. This releases pressure in back of valve A, closing this valve instantaneously, to shut off the steam. Safety trip can be tested easily while turbine is running by manually tripping and resetting lever C.



Sectional view showing lubricating system of fully enclosed Coppus Constant Speed Governor. Governor head acts directly on stem of steam admission valve. No external levers required. Ball bearing construction eliminates end play and gives frictionless operation.

Coppus Turbines ranging from 150 hp down to fractional in 6 frame sizes

CUT YOUR COSTS PER HORSEPOWER

When you choose from the Coppus Steam Turbine line, you get the right size for your requirements . . . and make substantial savings on *any* size from the 150 hp turbine down to the smallest. Low in first cost, Coppus Turbines save you more money in the long run. Operating and maintenance costs are kept low by such other features as: large number of steam nozzles, controlled individually by manually operated valves; hard chromium plating on shaft at the stuffing box; replaceable cartridge type bearing housings; optional carbon ring packing assembly for back pressures up to 75 pounds.

WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORPORATION, 268 Park Ave., Worcester 2, Mass. Sales offices in THOMAS' REGISTER.

COPPUS "BLUE RIBBON" TURBINES

Hitch your business to this star performer . . .

Stellar take-off and landing performance

Short fields are no problem! New Beechcraft propeller develops greater static thrust. Flap travel is increased; action is faster.

Plan *long* flights — you have the range!

The Bonanza's 750-mile range can be increased to 940 or 1,145 miles by installation of 10-gallon or 20-gallon auxiliary fuel tanks.

the Beechcraft BONANZA

Beechcraft Bonanzas serve as company-owned planes in almost every field of American business. More than 2,400 are now delivered. They slice travel time by two-thirds; give key men the incalculable advantage of any-time mobility. *Features* put this trim, exceptionally fast plane at the "head of the class"; make it *the* outstanding buy. Here are just a few of the features that make this greater-than-ever Beechcraft a better-than-ever value.

Extra style and comfort features

Touches of luxury: four arm rests, four individual ash trays, special coat hanger rod to carry clothes with never a wrinkle.

Take-off horsepower rating increased

Now 196 h.p. at 2,450 rpm. Landing gear action speeded up: lowered in 7½ seconds, raised in 8½ seconds at 105 mph.

Room for *all* the luggage you need!

Baggage compartment is accessible from inside or out. Room, too, for four big people in the smartly tailored *quiet* cabin.

Sturdy framework gives you unsurpassable safety

All-metal framework is stronger than conventional construction. Exceptionally rugged: Shock, stress tests far surpass CAA requirements.

There's more to the Bonanza story! Let your nearest Beechcraft distributor or dealer "fill you in" on facts about the Model B35 Beechcraft Bonanza's exceptional economy in operation. Or for more information, write on your letterhead today to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles
Fuel economy, 9.5 gph

Beechcraft BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Round up more temperatures in less space and time-

. . . with a

multipoint SPEEDOMAX INDICATOR

MORE than twice as many unit temperatures can be checked with a *single* Speedomax Indicator as with any other one, self-contained standard instrument available today. Reason is unique design which lets one instrument case hold both Indicator and all connections from as many as 126 thermocouples. Thus, an operator can check all unit temperatures without reaching for out-of-the-way switch boxes . . . without moving a foot. Such convenience is ideal for routine logging. And in emergency, when many more couples must be checked with least delay, this type of Speedomax can become vital.

Speedomax is fast as well as convenient. Its drum-mounted scale spins from lowest to highest temperature in 4 seconds; for smaller jumps, proportionately faster. This standard speed can be cut to 2 seconds if desired.

Jrl. Ad ND46-33A-700(1)

Key type switches—relied upon for years in refineries—are employed for their dependable service. Push-button or rotary switches can also be supplied, but accommodate fewer thermocouples per instrument.

Some refineries also use another Speedomax model which not only indicates, but can be switched to automatic signalling or recording. It fans through 20 to 160 thermocouples at only 4 seconds apiece.

If you have an application in mind, an L&N field engineer will call, or send catalog, as you prefer. Just write Leeds & Northrup Co., 4959 Stenton Ave., Phila. 44, Pa.

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in this "7½ billion-a-year" success?

NEVER was there a partnership like the nation-wide brotherhood of volunteers who have helped sell, advertise, and promote sales of U. S. Savings Bonds! Their program is the greatest sales operation at the lowest cost in history.

Your continued support in promoting the Payroll Savings Plan will help "America's partnership" this year to repeat or surpass last year's four-star performance, in which sales of Savings Bonds were 7½ billion dollars—*exceeding redemptions by far more than a billion!*

So keep up the splendid work—keep on telling and selling your employees the advantages of Payroll Savings: (1) ease; (2) regularity; (3) safety of investment; (4) security for the individual and the nation; (5) $4 for every $3 at maturity! And, remember, people with a stake in the future are the most stable, most productive employees.

For any help you need in conducting the Plan, call on your State Director of the Treasury Department's Savings Bonds Division.

New Savings Bonds Plan won't affect the P.S.P.

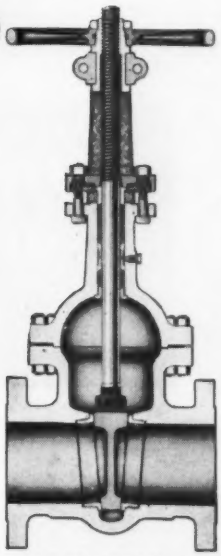
THE Treasury Department and the banks of America are making it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

The Treasury Department acknowledges with appreciation the publication of this message by

THE OIL AND GAS JOURNAL
Tulsa 1, Oklahoma

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

If it's piping equipment for refineries ...It's in the complete CRANE line



No. 33x, 300-Pound Steel Gate Valve for Oil and Oil Vapor Services Up to 1000° F. Max. Temp. Sizes: 1½ to 24-inch

BEST FOR OIL AND OIL VAPOR SERVICES

Crane Cast Steel Wedge Gate Valves find wide application in refineries everywhere because they assure dependable performance under all conditions. Body and bonnet are unusually rugged. Straight-through ports minimize turbulence, erosion and resistance to flow. Full length disc guides insure positive seating on shoulder-type, screwed-in body seat rings.

Strong tee-head disc-stem connection, easily lubricated yoke, and ample non-corrosive bearings assure smooth operation. Made of Carbon or Alloy Steels with trim materials suitable for pressures and temperatures up to 2500 pounds at 1000° F. Flanged, screwed, or welding ends available. See your new No. 49 Crane Catalog.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
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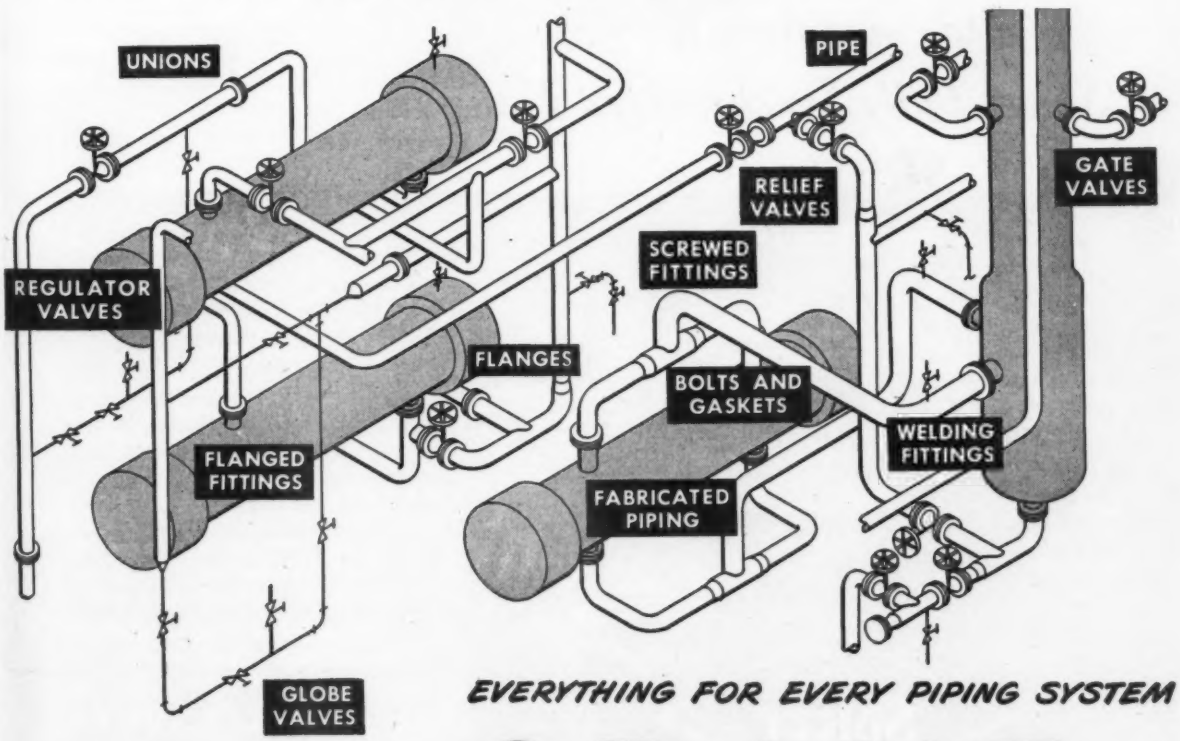
● ***ONE ORDER TO CRANE COVERS ALL PIPING EQUIPMENT FOR THIS VAPOR RECOVERY UNIT HOOKUP, FOR EXAMPLE.***

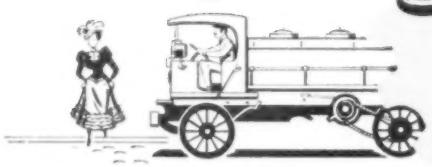


EVERYTHING FOR EVERY PIPING SYSTEM

CRANE

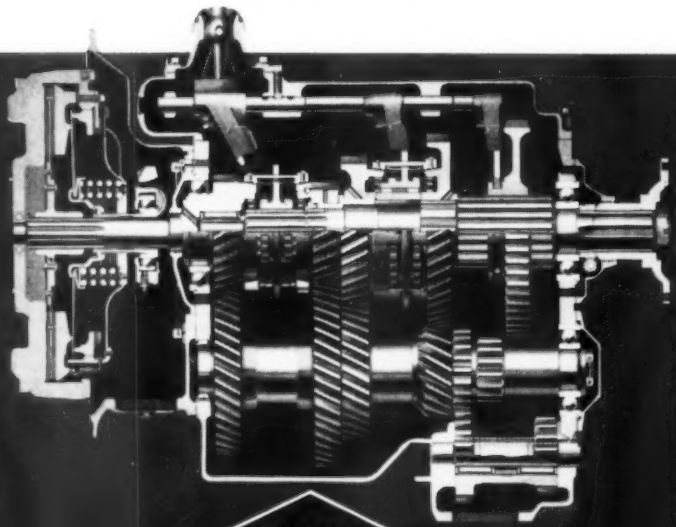
VALVES • FITTINGS • PIPE • PLUMBING AND HEATING

"Constant-Mesh Transmissions are as old-fashioned as High-Button Shoes"



–say operators of

Spicer Fully Synchronized Transmissions



46 YEARS OF Spicer SERVICE

The clashing and smashing of gears is as out of date as solid tires. Engine lugging, missed shifts, and excessive slowdown for shifting belong to the days of the hand crank and acetylene lights.

The Spicer *Fully* Synchronized Transmission has eliminated all these inefficient, clumsy driving operations. It is *fully* synchronized in all four top speeds, permitting quick, clean shifts with the lever travelling the same distance every shift. You get fast getaway – shifts are made without slowdown for double-clutching. Fuel savings and lower vehicle upkeep are assured.

Get out of the button-shoe era – streamline your vehicle operation with the Spicer *Fully* Synchronized Transmission.

SPICER MANUFACTURING
Division of Dana Corporation
TOLEDO 1, OHIO

• TRANSMISSIONS • PASSENGER CAR AXLES • CLUTCHES • PARISH FRAMES • TORQUE CONVERTERS • FORGINGS STAMPINGS • UNIVERSAL JOINTS • SPICER "BROWN-LIPE" GEAR BOXES • RAILWAY GENERATOR DRIVES

Now, more than 250 Thermal Crackers and Reformers have been engineered and constructed by Kellogg!

Yes! Kellogg-built Thermal Crackers and Reformers number more than 250... and more units are under construction on two continents!

KELLOGG'S first contribution to thermal cracking was the superior, hammer-welded Burton Still more than thirty years ago. The Cross and other thermal processes followed in rapid succession, and even by 1930 Kellogg had built more than 100 units from Brooklyn to Okmulgee.

In cooperation with major oil companies, through the Gasoline Products Company, Kellogg has continued to refine thermal cracking methods over the years — contributing to such other forms as delayed coking and further adapting the process to thermal reforming of naphthas. Still the most economical means of producing medium-octane fuels and of breaking down the heavy ends, thermal cracking is expected to play a major role in refining for years to come.

The data, experience and know-how acquired by Kellogg in this continuous, thirty-year association with the basic thermal refining process will prove valuable to any refiner contemplating thermal additions or modernizations.

COMMERCIAL OPERATING DATA IS THE MAJOR DEVELOPMENT WEAPON!

With such variables as cold oil velocity, flow direction, heat per square foot, pressure, temperature of flue gases and furnace efficiency to be coordinated with wide operating flexibility, the designing of cracking and reforming furnaces to maintain long runs at low operating costs — without loss of efficiency through coking — is no mean task. Increased understanding of basic theory and improved basic engineering have contributed much to thermal cracking efficiency. But the reams of data acquired from commercial operating plants provide the soundest base on which to design new units. With a vast amount of this information at hand, accumulated over a thirty-year period and covering the widest possible range of applications, Kellogg is in a unique position to assist refiners.

IT TAKES ALL SEVEN TO PRODUCE GREATER EARNING POWER...

1 THE DEVELOPMENT "TOOLS" —laboratories, pilot plants and recognized specialists to prove and improve processing and equipment ideas.

2 PROCESS ENGINEERING by three distinct groups of specialists—*sequence* engineers, *unit* engineers and *development* engineers—supported by an extensive reservoir of exclusive data.

3 SPECIALISTS IN EVERY PHASE of design engineering due to the completeness of Kellogg's engineering staff.

4 SPECIALIZED BUYERS backed by the cumulative buying power of the largest company in the business.

5 COMPLETE FABRICATING FACILITIES to make schedule deadlines and to develop workable "firsts" in refinery equipment.

6 CONSTRUCTION KNOW-HOW acquired in completing hundreds of major jobs, plus an ample supply of the proper tools, and the constant development of new money-and-time-saving methods on the construction lot.

7. PRACTICAL OPERATING COUNSEL on all design and construction problems. Kellogg maintains in its engineering departments a large group of practical refinery operators. They have a three-fold function: *First*, they work with design engineers to "design in" those elements contributing to easy and fool-proof commercial operation; *Second*, they create the finished unit's "Operating Instructions"; *Third*, they condition and supervise initial operation of the unit when construction is finished. Thus Kellogg designs incorporate the down-to-earth suggestions that come from day-in and day-out operation of units by practical operators.

...AND ONLY KELLOGG HAS ALL SEVEN!

The M. W. Kellogg Company, (a subsidiary of Pullman Incorporated), New York, Jersey City, Los Angeles, Tulsa, Houston, Toronto, London, Paris

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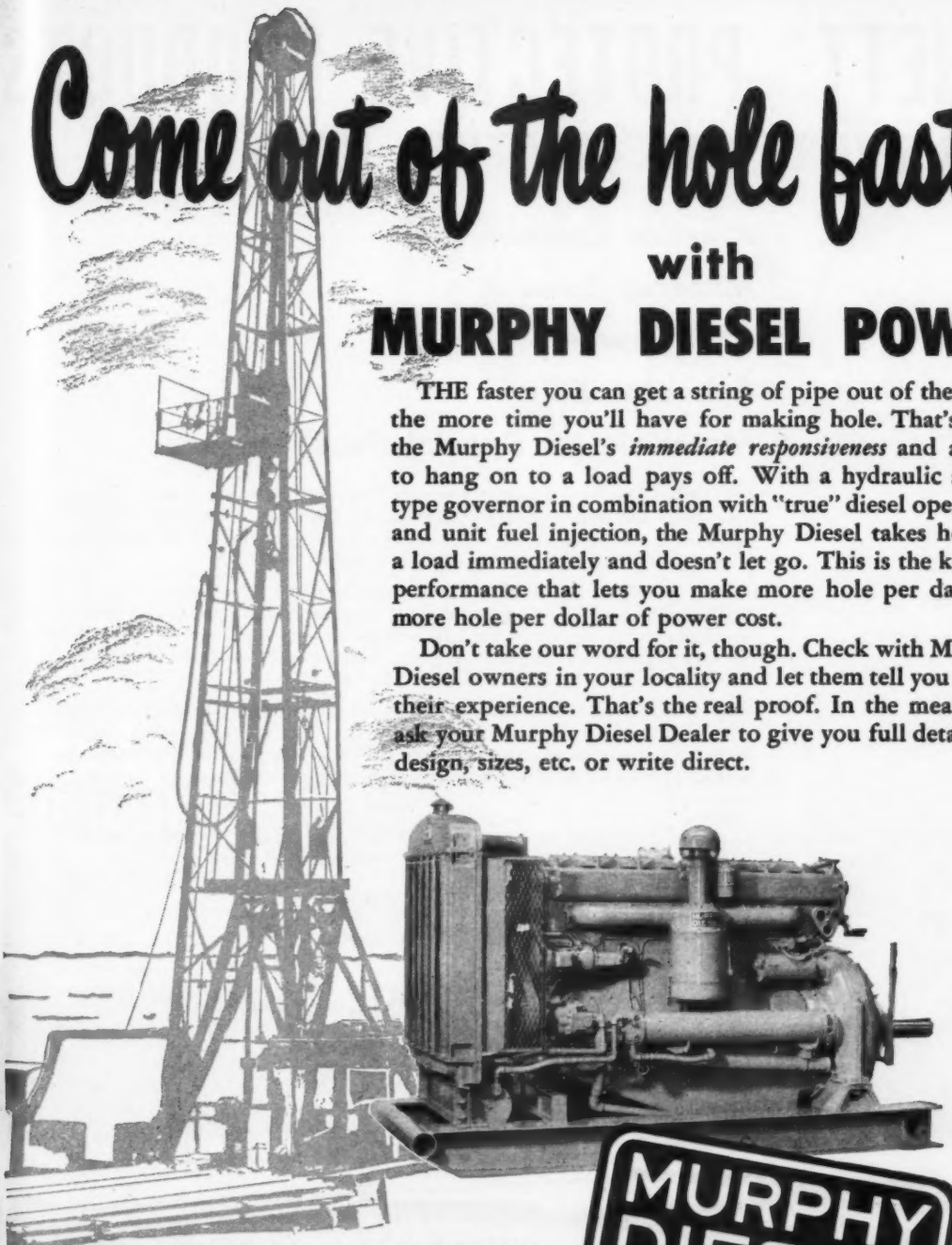
Come out of the hole faster

with

MURPHY DIESEL POWER

THE faster you can get a string of pipe out of the hole, the more time you'll have for making hole. That's how the Murphy Diesel's *immediate responsiveness* and ability to hang on to a load pays off. With a hydraulic servo-type governor in combination with "true" diesel operation and unit fuel injection, the Murphy Diesel takes hold of a load immediately and doesn't let go. This is the kind of performance that lets you make more hole per day and more hole per dollar of power cost.

Don't take our word for it, though. Check with Murphy Diesel owners in your locality and let them tell you about their experience. That's the real proof. In the meantime, ask your Murphy Diesel Dealer to give you full details on design, sizes, etc. or write direct.



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5305 West Burnham St., Milwaukee 14, Wisconsin
OIL INDUSTRY FACTORY BRANCH—Sales, Parts and Service:
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MURPHY DIESEL

Heavy duty power
for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 220 H.P. Diesel Electric Generator Sets 60 to 133 K.W.

BARRETT* PROTECTIVE PRODUCTS
COVER EVERY PIPE-COATING NEED

1 **Pipeline Enamel**
2 **Millwrap Enamel**
3 **A.A. Enamel**
4 **Asbestos Felt**
5 **Materials for Special Uses**

BARRETT* MILLWRAP ENAMEL

Like other Barrett* coal-tar enamels, Barrett* Millwrap Enamel is non-absorbent and impermeable by soil waters. Because of its stability when exposed to the surrounding electrolyte consisting of the entire soil composition, it retains its high electrical insulation value.

A permanent, strong, flexible shield protecting the pipe from corrosion, Barrett Millwrap Enamel is recommended for its ease of application and satisfactory performance. It combines the best service characteristics of the Barrett refined coal-tar pitches used in producing both regular and plasticized enamels. It does not crack at 0° F.; nor flow at 140° F.

Barrett Millwrap Enamel has demonstrated its ability to protect underground lines in extremely corrosive locations. It is also outstanding in its ability to withstand stockpile exposures before the pipe is laid, as well as exposure normal to pre-coated pipe protected at coating plants, yards, or railhead locations.

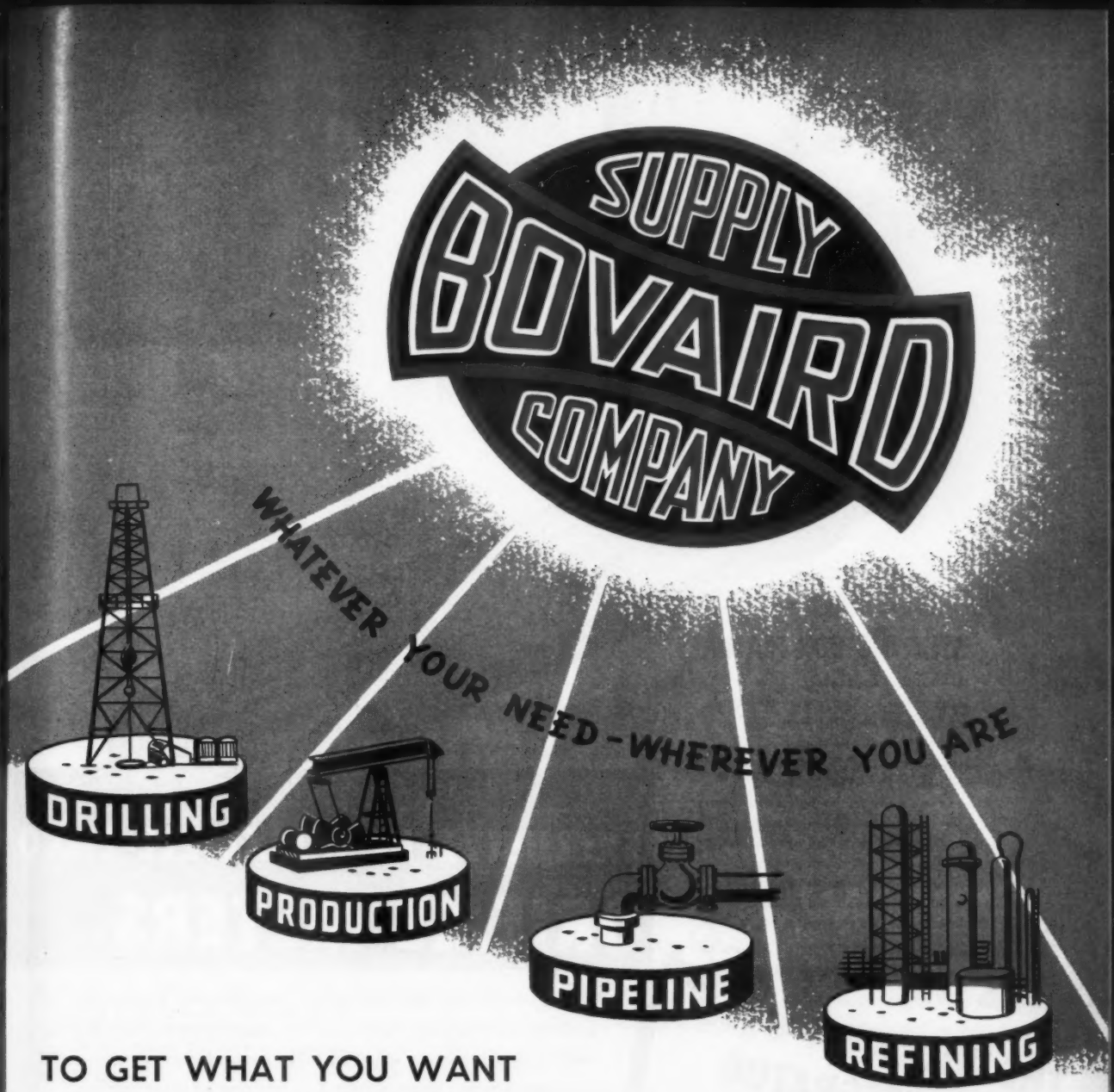
Memo: **FOR CORROSION ENGINEERS**

Barrett coal-tar materials for special uses are all dependable, durable and economical. Eternium* Paint for exposed metal work. CA-50 Heavy Duty Cold Application Coating for concrete and metal exposed to extremely corrosive conditions. Marine Enamel for ships, barges and off-shore service vessels. Service Cement and Pipeline Fabric for field joints — no torching required. Asbestos Pipeline Felt for soil stress shield. Tank Bottom Compound for sour crude storage. 34 YB Paint for exposure to salt water spray conditions.

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

*Reg. U. S. Pat. Off.



TO GET WHAT YOU WANT
WHERE YOU WANT IT
WHEN YOU NEED IT . . .

"Buy From Bovaird"

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THE Bovaird SUPPLY CO.

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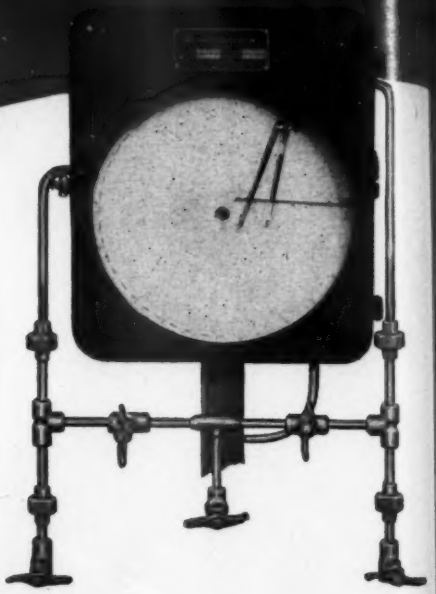
NEW!

LEAKPROOF STUFFING BOX
Requires No Lubricant



STUFFING BOX FEATURES

The heart of this unit is a combination packing and bearing made of synthetic Teflon. This material is tough, chemically resistant, stands up to 450° F., has a low coefficient of friction. It flows slightly under extreme pressures. Spring loaded follower serves as a pilot to adjust bearing to contours of body and periphery of shaft —seals tight with minimum friction. All other parts are made of stainless steel. Shaft and Teflon bearing may be replaced in the field.

EXCLUSIVE IN ROCKWELL-EMCO
ORIFICE METERS

Now it can be told! For well over a year the new Rockwell stuffing box has been field tested by major pipeline companies and cycling plants on all kinds of gases and pressures. Performance has been outstanding! At one of these cycling plants the new stuffing box is working at flow temperatures of 200° F. and pressures of from 3600 to 4000 psi. Factory tests of this design, *without lubricant,* show absolutely no leakage handling nitrogen at high pressure and free rotation of the shaft under a *torque of only* 9.7 *inch-grams.* So successful is the new stuffing box that its use is now standard on both high and low pressure Rockwell-Emco orifice meters. Packaged kits for converting meters in service are available. Write for full details.

THE ROCKWELL-EMCO INTEGRATOR

The charts from many high pressure meters represent several thousand dollars. Hence accuracy in chart calculation is imperative. The operator of a Rockwell-Emco integrator mechanically computes charts by simply tracing the pressure and differential records made by the meter. The total extension then appears on a direct reading counter, accurate to ½ of 1 per cent or closer.

ROCKWELL MANUFACTURING COMPANY

Atlanta Boston Chicago Columbus Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa

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another Owens-Corning FIRST!

NEW Parallel Reinforced Coromat Pipe Wrap ...50% Stronger!

Lick Your Problems Aboveground and Below With the Wrap That's Better *NATURALLY!* Now breakage is practically impossible. The parallel reinforcing of glass is stronger weight-for-weight than most steels — and that means more miles per day for the dope man!

Look at the picture. The glass fibers are fine and there are more of them. This means even density, perfect penetration, no holidays.

Made of glass, Coromat is better *naturally*... has highest resistance to electrolysis and acids. It won't rot. It has highest impact resistance. Dimensionally stable, Coromat has no wicking action, won't take up moisture, won't sag underground.

Backed by science and experience, Coromat is doing a better job everywhere, and the new parallel reinforced Coromat makes the best still better. Why accept less? Get data and samples now!

We originated glass wraps.
We have the facilities.
Our research never ceases.
When better wraps are built, we will build them!

OWENS-CORNING
FIBERGLAS

COROMAT Pipe Wrap

**Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers. Coromat is the trade-mark of Owens-Corning Fiberglas Corporation.*

FREE! Write for booklet, "Corrosion Protection for Underground Pipe", and sample of Coromat.
Owens-Corning Fiberglas Corporation, Dept. 54-G4, Toledo 1, Ohio. Branches in principal cities.

FIBERGLAS IS IN YOUR LIFE...FOR GOOD!

FOR LIMITED NPSH APPLICATIONS IN ALL INDUSTRIAL PROCESSES

...AND FOR INSTALLATIONS WHERE FLOOR SPACE IS AT A PREMIUM

THE *Peerless* HYDRO-LINE

ENCASED CLOSE-COUPLED VERTICAL CENTRIFUGAL PUMP

For application to: **Petroleum Refinery Techniques • Line Booster Service • Chemical Processing • Condensate Return Service.**

Especially suited for Pumping: **Hydrocarbons, such as: Gasoline, Propane, Butane, Oils, etc. • Hot or Cold Water • Acids • Bases • Salt Solutions—Mild or concentrated at temperatures from normal to 400° F.**

This successful modification of the Peerless vertical, close-coupled turbine pump, for industrial processes embodies all the exacting design, construction and performance characteristics which have made Peerless the sales leader in the field of vertical turbine pumps. The Peerless Hydro-Line is easy to understand, install, operate and maintain. It has been especially designed for limited space requirements and for limited NPSH applications. Request your copy of Peefless Bulletin B-592 for full details of Hydro-Line design, construction, application and performance.

CHARACTERISTICS AT A GLANCE:

CAPACITIES
Up to 5000 GPM.

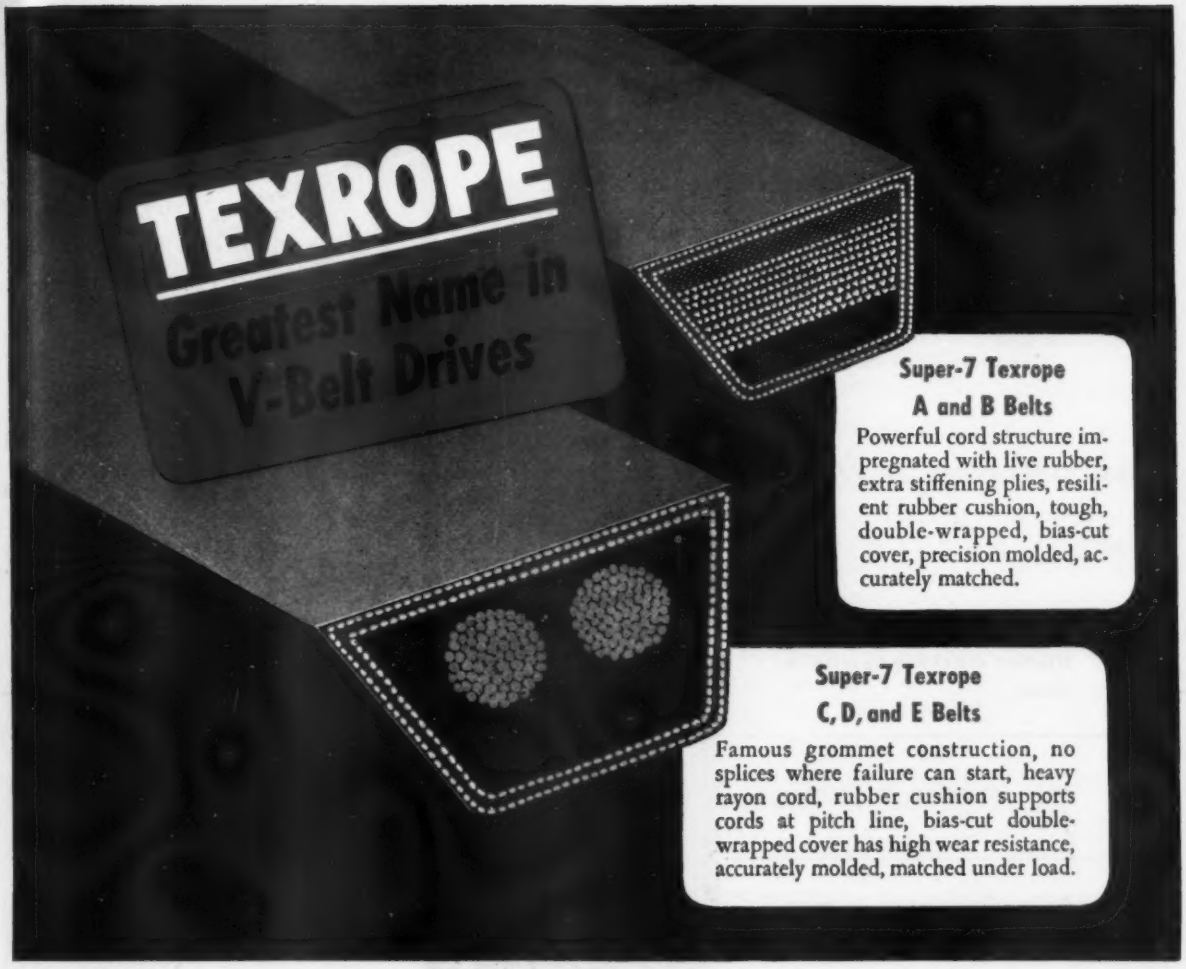
HEADS
Up to 1500 feet.

DRIVES
As required; standard vertical, solid shaft, hollow-shaft, or explosion-proof motors; steam turbine.

MATERIALS
Cast iron bowls, bronze impellers, #416 stainless steel shaft, standard; any special materials can be furnished on order to suit the individual need.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Factories: Los Angeles, California, and Indianapolis, Indiana.
Offices: New York, Atlanta, Chicago, St. Louis, Phoenix, Fresno, Los Angeles; Dallas, Plainview and Lubbock, Texas.

XUM



Super-7 Texrope
A and B Belts

Powerful cord structure impregnated with live rubber, extra stiffening plies, resilient rubber cushion, tough, double-wrapped, bias-cut cover, precision molded, accurately matched.

Super-7 Texrope
C, D, and E Belts

Famous grommet construction, no splices where failure can start, heavy rayon cord, rubber cushion supports cords at pitch line, bias-cut double-wrapped cover has high wear resistance, accurately molded, matched under load.

LONG LIFE FOR YOUR DRIVES

YOU GET MORE than good belts when you standardize on *Super-7 Texrope* V-belts in your plant. You also get the benefit of the greatest V-belt experience in the world. This means you are sure of exactly the right drive for longest life on your job. *Texrope* Drive Department of Allis-Chalmers originated the multiple V-belt drive and there are more *Texrope* multiple V-belt drives in operation than any other make.

High Capacity Belts

These belts have extra strong cords, special rubber cushion and tough neoprene cover to give them 40% greater capacity than standard belts at proportionately higher price. Recommended only for applications where space is limited or other special conditions demand a heavier duty belt. Made in A, B, C, D and E sections.

Complete V-belt Service

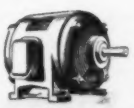
Get everything you need for your V-belt drives . . . new and replacement V-belts, standard and variable speed sheaves and speed changers . . . from one reliable source. 144 page *Texrope* Pre-engineered Drive manual covers 90% of requirements. Get your copy today from your A-C Authorized Dealer or Sales Office or write for Bulletin 20B6956.

Texrope and *Super-7* are Allis-Chalmers trademarks. *Super-7 Texrope* V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS, 1059A SO. 70 ST. A-3021
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — ½ to 25,000 hp and up. All types.

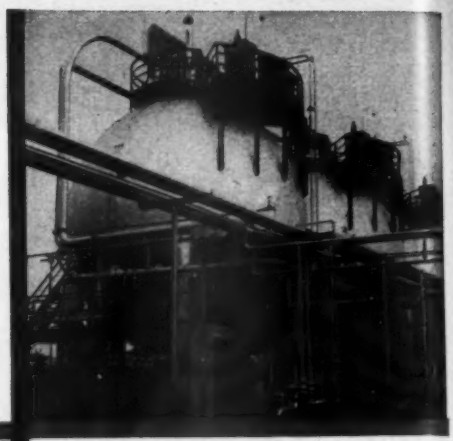
CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

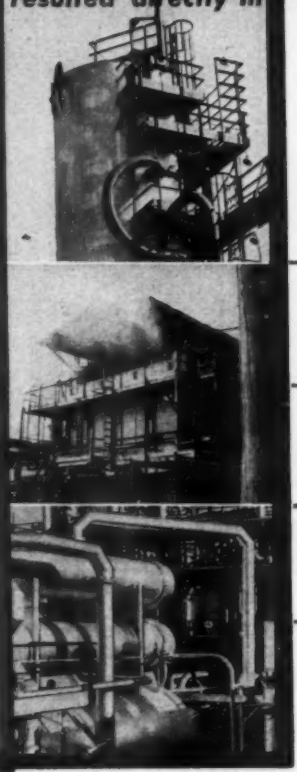
ALLIS-CHALMERS

PETRECO DESALTING

consistently delivers a crude charge with minimum salt and solid content. A recent survey of all Petreco Desalters operating in oil refineries throughout the United States and Canada disclosed that Petreco Desalting was showing a very rapid pay-out in terms of improved refinery operations. It showed that:



THESE OPERATING ADVANTAGES	resulted directly in	THESE PROFITABLE ECONOMIES
Higher cracking temperatures.		*Deeper cracking, increased gasoline yield.*
Less plugging in furnace tubes.		*Fewer tube failures, higher charge rates.*
Reduced corrosion in overhead equipment.		*Less shut-downs due to mechanical failures.*
Less plugging in exchangers.		*Lower clean-out costs, more efficient heat exchange, longer runs.*



[redacted] DESALTING SERVICE, PERSONNEL AND FACILITIES

These are not the *only* benefits to be derived from Petreco Desalting – they are the benefits consistently enjoyed by the majority of Petreco users. For complete information on Petreco Desalting get in touch with the nearest Petreco office.

PETROLEUM RECTIFYING COMPANY

5121 So. Wayside Drive, Houston 1, Texas

1390 E. Burnett Street, Long Beach, Calif.

PETRECO

SPECIALIZED Electric PETROLEUM PROCESSES { DESALTING / DEHYDRATING

PR 50-1

XUM

The World's Best Dressed V-BELT!

HERE'S A V-BELT that always wears a jacket—an exclusive protective jacket that keeps out dirt and abrasive dust, prolonging belt life. The straight sidewalls of U. S. RAINBOW V-BELTS grip the grooves for complete contact the full height of the belt, providing extra pulling power. The unique Equa-Tensil Cord Section makes sure that each cord pulls its balanced share of the load so that the belt can absorb rougher shocks, take heavier loads.

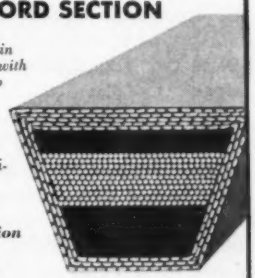
Telephone your U. S. Rubber V-Belt specialist. He will show you how to make every belt in multiple assemblies pull its full share of the load. By making use of this "U. S." service, you can make sure that every belt will run smoothly on the sheave.

EQUA-TENSIL CORD SECTION

***1. Top rubber cushion** in closely engineered balance with the lower section . . . to keep cool under constant stretch and turn.*

***2. Equa-Tensil Cord Section**—all cords scientifically placed, each pulling its full share of the load.*

***3. A sturdy level cushion** for the Equa-Tensil Cord Section provides structural firmness for V-grooves and over the flat pulley of V-to-flat drives.*



United States Rubber engineers have designed so many different V-belts that today, if you want a "special" in a hurry, chances are it can be obtained without making a new mold. Write to address below.

PRODUCTS OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

PIPELINE OFFICIALS GATHER TO SEE REVOLUTIONARY NEW ANGLE GAS ENGINE COMPRESSOR

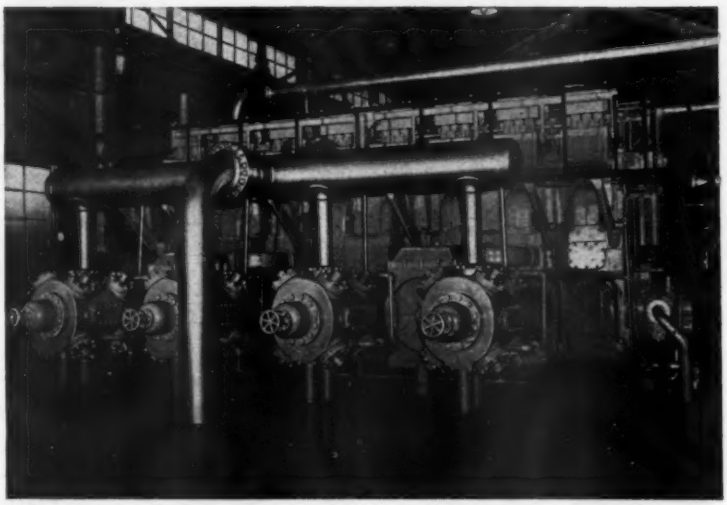
Tennessee Gas Transmission Company's New Worthington Uniflo TYPE UTC-16 Draws Visitors From Near And Far

So widespread was the interest in Worthington's new Angle Gas Engine Compressor, TYPE UTC-16, that engineers and other executives from transmission companies all over the country came to see the first of these units in actual service — at the Tennessee Gas Transmission Company's Monroe, La., plant.

Advance notices of outstanding performance were fully lived up to, observers being particularly enthusiastic over the new uniflo scavenging. This radical improvement over conventional loop design provides more than double the port area and 50% more exhaust area. Straight-line air flow thoroughly cleanses and cools the entire cylinder, and timed valves retain greater weight of pure air for perfect combustion and stepped-up supercharging.

Features For Top Performance

En bloc frame, with removable cylinder liners . . . double air manifolds . . . completely symmetrical outer piston walls, wrist-pin in separate carrier . . . cone-type cylinder head, with streamlined passages and two large exhaust valves . gear driven camshafts for positive drive and perfect timing . . . positive pressure lubrication through cast-in manifolds to all moving parts . . . large access doors on both sides of frame for complete accessibility . . . Worthington Feather* Valves, most efficient ever made, in all cylinders.



The Tennessee Gas Transmission Company's new Worthington Angle Gas Engine Compressor — uniflo TYPE UTC-16 — installed at Monroe, La. The Company's natural gas pipeline will reach Buffalo, N. Y., and further extension is planned.

Wide Usefulness

On pipeline duty, in refinery service— in fact, wherever gas must be compressed and suitable gas fuel is available — the uniflo TYPE UTC-16 offers dependability and economy never before possible . . . proof that, as always, *there's more worth in Worthington.* Learn more about this outstanding advancement in angle gas engine compressors. Contact your nearest Worthington Branch Office or the *Worthington Pump and Machinery Corporation, Engine Division, Buffalo, N. Y.*

WORTHINGTON

*Reg. U. S. Pat. Off.

EK-5-1

NO OTHER COMPRESSOR WILL OUTPERFORM A WORTHINGTON

Y-Types

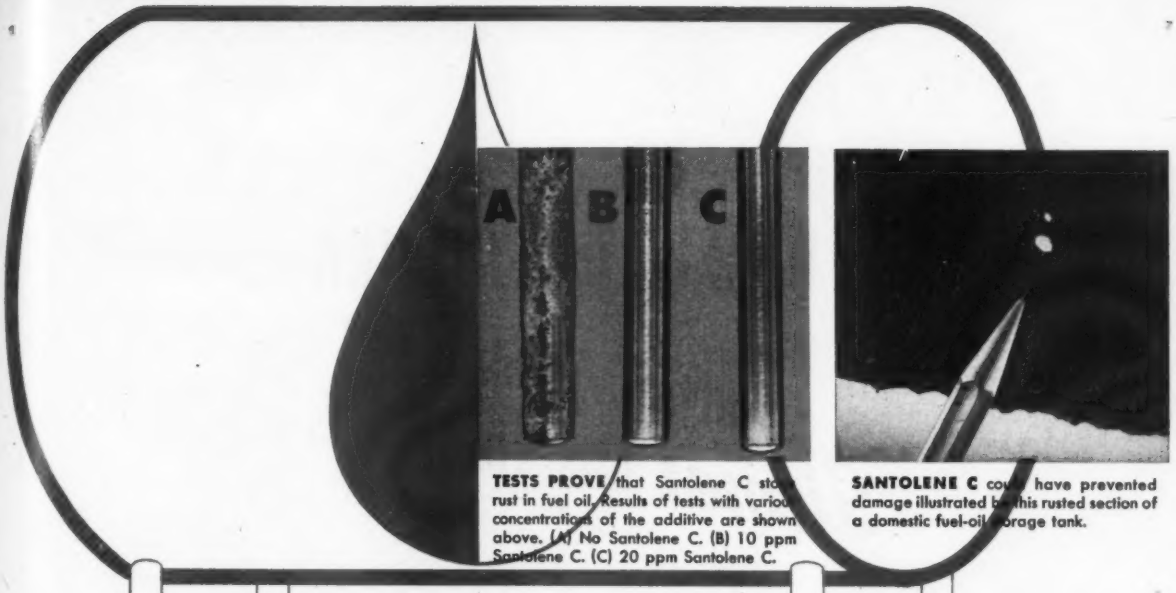
Vertical

Horizontal

Portable

Radial

Gas-Engine Compressors



TESTS PROVE that Santolene C stops rust in fuel oil. Results of tests with various concentrations of the additive are shown above. (A) No Santolene C. (B) 10 ppm Santolene C. (C) 20 ppm Santolene C.

SANTOLENE C could have prevented damage illustrated by this rusted section of a domestic fuel-oil storage tank.

SANTOLENE C *STOPS RUST*

and gives your fuel oil a sales-making quality

Tell your fuel oil customers that your product prevents rust in their storage tanks and you'll get a larger share of the fuel oil business.

You can make that statement . . . and your oil can back it up with performance . . . if you add a minute quantity of Monsanto Santolene C to your product.

Santolene C stops rust . . . *economically*. The cost of inhibiting rust in a 42-gallon barrel of fuel oil usually is less than two-tenths ($0.002) of a cent.

Mail the coupon for details on how Santolene C can prevent rust in pipe lines and tanks . . . how it is effective in fuel oil, gasoline or any type of light petroleum product. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1745-F South Second Street, St. Louis 4, Missouri.

Santolene: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
Organic Chemicals Division
1745-F South Second Street, St. Louis 4, Missouri

Please send information on Santolene C, rust-inhibiting additive for light petroleum products.

Name..... *Title*.....

Company.....

Street.....

City..... *Zone*.... *State*.....

SERVING INDUSTRY . . . WHICH SERVES MANKIND

Now WILSON has GILMER...

and in V-Belts Gilmer has the PULL

GILMER is proud to announce that the WILSON SUPPLY COMPANY is ready to serve your V-Belt needs.

Wilson's reputation for excellent service is known throughout the oil industry. And you can count on getting Gilmer V-Belts—with their lasting economy for any oil field drives—quickly from your nearest Wilson store.

Now you'll be able to get even better service on Gilmer V-Belts! In Texas, Louisiana, and Arkansas, depend on Wilson for efficient service and complete stocks.

L. H. GILMER COMPANY
TACONY, PHILADELPHIA 35, PA.
Division of United States Rubber Company

Gilmer BELTS

WILSON SUPPLY COMPANY

1412 MAURY STREET
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New Orleans	ARKANSAS: Magnolia.

NOW 8 BASIC CHRYSLER ENGINES

FROM WHICH TO CHOOSE

In scores of industrial applications, Chrysler Industrial Engines are out-performing all other similarly rated engines. With less down time! With lower lifetime cost per hour. That comes from famed Chrysler engineering and high precision manufacturing. Yet thanks to Chrysler mass production economies, you can buy Chrysler power for *less money!*

If you use internal combustion power requiring 200 to 400 cubic inches piston displacement, get *more for less!* Phone your Chrysler Industrial Engine dealer or write us. ***Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.***

CHRYSLER

Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE

PB Relieved End CASING PROTECTORS

... give extra shock and tear resistance where it's needed most!

1. RUGGED! PB's *relieved end* design puts extra grip in the center—takes the stress off the ends—*gives extra shock and tear resistance where it's needed most.* PB's field proven rubber holds up under the toughest drilling conditions—withstands deepest drilling temperatures!

2. SPEEDS UP DRILLING. Field records show that PB Protectors cut friction, torque and power waste . . . allow higher drilling speeds . . . permit more accurate control of weight on the bit.

3. FULL PROTECTION for your drill pipe and casing. *Sure grip* PB Protectors stay as installed—will not slip.

Write today for 1950 catalog.

PB casing protectors installed from transfer sleeve to drill pipe in less than 4 seconds!

Our man can install PB Protectors while you make up or run pipe. No down-time while adding protectors—big savings for the rig operator!

Call your local PB representative today for a demonstration of this faster hydraulic installation equipment—available only with PB.

PB

Patterson-Ballagh

Division of Byron Jackson Co.

MAIN OFFICE: 1900 East 65th Street
Los Angeles 1, California

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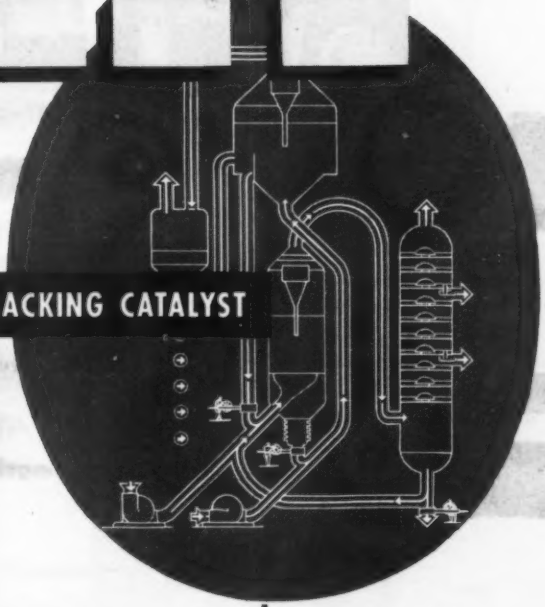
LEADING REFINERIES STANDARDIZE ON . . .

DA-1®

DAVISON FLUID SYNTHETIC CRACKING CATALYST



MAXIMUM catalyst utilization resulting in top efficiency and economy of operation is the reason most often given by leading refineries for standardizing on DA-1. Davison's close laboratory control over production maintains the high standard of uniformity in physical, chemical and catalytic characteristics of DA-1. It will pay you in increased cracking efficiency to investigate DA-1 . . . available in three grades . . .

F-1, Fine Grind—C-1, Intermediate Grind—C-2, Coarse Grind

For special processes, Davison can offer you an experienced staff and a modern, new plant devoted exclusively to the development and production of custom catalysts in granular, powdered or pelleted form.

Requests for information about DA-1—or any other Davison product or service—will secure immediate attention.

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

BALTIMORE-3, MD.

Davison offers you—

FACILITIES—Plants located in Baltimore and Cincinnati assure fast service and two reliable sources for your catalyst requirements.

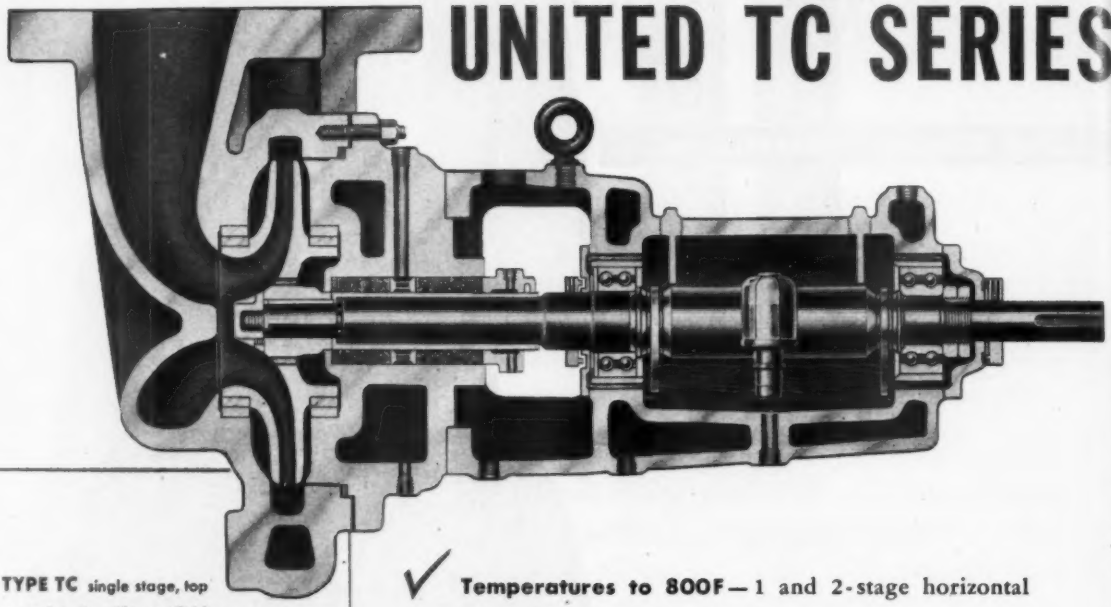
EXPERIENCE—Producers of catalysts since the installation of the first fluid catalyst cracking plant.

SERVICE—New and expanded facilities for catalyst testing and evaluation.

Also producers of:

SILICA GEL • SILICOFLUORIDES
CASTING COMPOUNDS
ALUM • INORGANIC ACIDS
AGRICULTURAL CHEMICALS

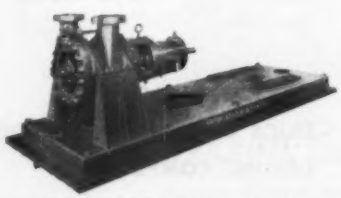
Process pump problems? *check* UNITED TC SERIES



TYPE TC single stage, top or end suction. Also available as type CTC where water cooling is not required. Double volute gives radial balance. Hydraulic balance virtually eliminates thrust. Stuffing box, under suction pressure, is extra deep for ample packing or mechanical seal. 1½", 2", 3", 4" and 6". Capacities to 1400 gpm, heads to 700'.

TYPE VTC, space-saver, vertical counterpart of TC pump, shown above, available in same sizes, capacities, and heads.

TYPE TCM, 2-stage, offers same basic features as TC Pump shown above. 1½", 2" and 3". Capacities to 600 gpm, heads to 1200'.



✓ **Temperatures to 800F**—1 and 2-stage horizontal pumps, saddle mounted to allow equal expansion from center line and support piping without case distortion.

✓ **Simplified servicing**—easy accessibility, quickly disassembled without disturbing piping or motor.

✓ **Interchangeability of parts** allows minimum parts inventories.

✓ **Dependability**—backed by United's quarter-century of specialized service to the oil industries, every design feature is engineered for maximum dependability and efficiency.

✓ **Wide range**—1½" to 6", capacities to 1400 gpm, heads to 1200', metallurgy as required, available with slurry or coke crusher adaptations or open impellers.

For more details write now for Bulletin No 5-220

UNITED CENTRIFUGAL PUMPS

Division of United Iron Works
Since 1908

Main Offices and Plants: **Oakland 7, California**

Sales Offices: LOS ANGELES • HOUSTON • DENVER • TULSA • ST. LOUIS • CHICAGO • CLEVELAND • NEW YORK

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TEL
servi
Lead
upon
or to
pair
Assi
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Use Du Pont Services to...

Save Time... Save Trouble... Save Money in Making Better Gasoline

TEL USE—The Du Pont Representative provides useful services on all problems related to the use of Tetraethyl Lead Compounds and other additives. He can be called upon for advice on efficient utilization of TEL Compounds or to supervise TEL blending plant maintenance and repair work and to advise on tank entries.

PLANNING—Whether you are building a new blending plant, selecting a site, or want to provide for future expansion of your present blending facilities, the Du Pont Representative will work with you. Through him you can obtain standard or special plans and specifications as well as actual on-the-spot assistance.

EMERGENCY AID—Du Pont Representatives are always available to assist in taking care of special or emergency problems such as those that might be caused by a damaged shipment of TEL compounds, a leaking valve, a ruptured tank or any problem of this nature.

Assistance in TEL handling starts with blending plant design.

Operators are instructed in proper unloading procedures.

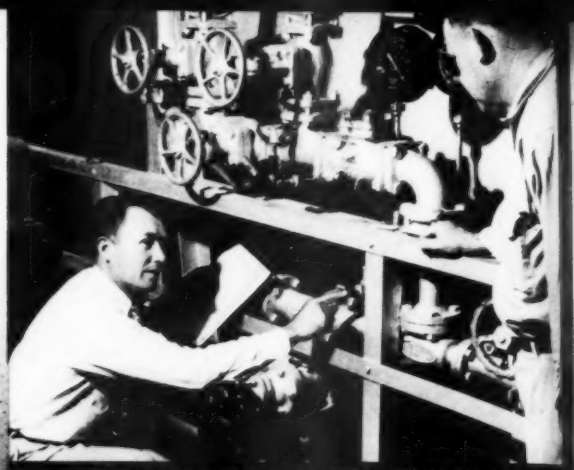
DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
... Through Chemistry

USE DU PONT TETRAETHYL LEAD COMPOUNDS

XUM

Results of Field Laboratory investigations check a refiner's own findings as well as having many other uses.



Quarterly inspections of blending plants are only one the services insuring peak operating efficiency at all tim

Du Pont Services Meet Many Blending Problems

Representatives are always available for assistance when repair or maintenance is required.

Blending plant repair parts and complete safety equipment are maintained in each district for quick use.

Du Pont Representatives provide those technical, safety, and medical services that directly contribute to blending plant efficiency and to refining economies. This is part of a planned Du Pont program designed to aid the refiner in making better gasolines . . . more economically.

DID YOU KNOW

That Du Pont neoprene packings make possible the efficient testing of extremely deep wells. Neoprene, because of its abrasion resistance, heat resistance and imperviousness to attack by oils is used in many oil field and refinery operations.

MAKE DU PONT THE SOURCE FOR ALL OF YOUR GASOLINE ADDITIVES ▶ TETRAETHYL LEAD COMPOUNDS *(Motor Mix—Aviation Mix)* ANTIOXIDANTS • METAL DEACTIVATOR • DYES

DU PONT

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
PETROLEUM CHEMICALS DIVISION
Wilmington 98, Delaware

District Offices: New York, N. Y.; Chicago, Ill.; Tul... Okla.; Houston, Texas; Los Angeles, Cal...

District Laboratories: Wilmington, Del.; Chicago, Ill.; Tul... Okla.; Houston, Texas; El Monte, Cal...

WALWORTH builds more Value in *Valves*

No. 91 Bronze Globe Valve

No. 709 Iron Body Saddle Gate Valve

No. 1718F Steel-Iron Lubricated Plug Valve

Jones & Laughlin Supply makes them readily *Available*

Tough . . . wear resistant . . . dependable!

106 years experience make these advantages a "natural" with Walworth. Walworth builds to exceptional dimensional accuracy and their products have outstanding metallurgical properties. You get the benefit in greater value wherever you install a Walworth.

Every department of the oil industry can profitably use Walworth products. Whether you're a driller, producer, pipeliner or refiner, get more value for your valve money by specifying Walworth.

We exist for the sole purpose of making quality oil country equipment readily available to you. To do this we have established 79 stores—all stocked with outstanding equipment such as Walworth. Wherever you operate from the Rockies to the Atlantic, from Canada to the Gulf—you're always near a Jones & Laughlin Supply store. Use it to save time; use it to be sure of getting quality supplies.

"... here's MY warehouse!"

Jones & Laughlin Supply Company

Subsidiary of Jones & Laughlin Steel Corporation

J&L STEEL

TULSA, OKLAHOMA

EXPORT: 405 LEXINGTON AVE., NEW YORK, N.Y. U.S.A.

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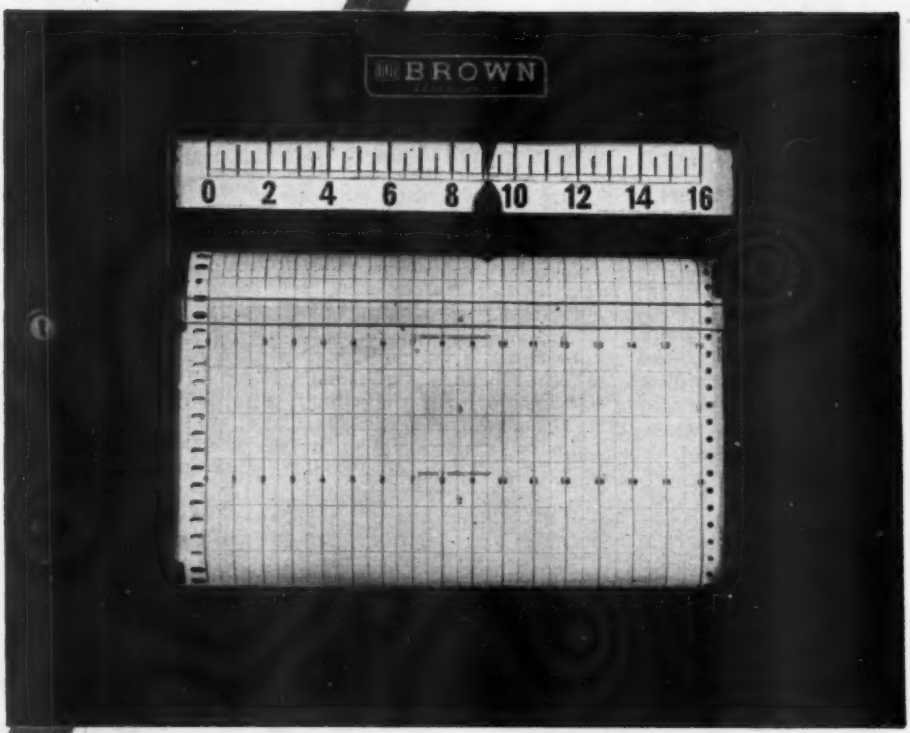
In Laboratories, Too . . .

THE VERSATILE *ElectroniK* STRIP-CHART RECORDER



The Sargent Polarograph, with *ElectroniK* Recorder, used for the qualitative and quantitative analysis of compounds subject to electrolytic oxidation and reduction. *Write for Data Sheet 10.16-5.*

The General Electric Mass Spectrometer, with *ElectroniK* Recorder, used for the qualitative and quantitative analysis of gases. *Write for Data Sheet 10.16-11.*

XUM

IS DOING A MAN-SIZE JOB!

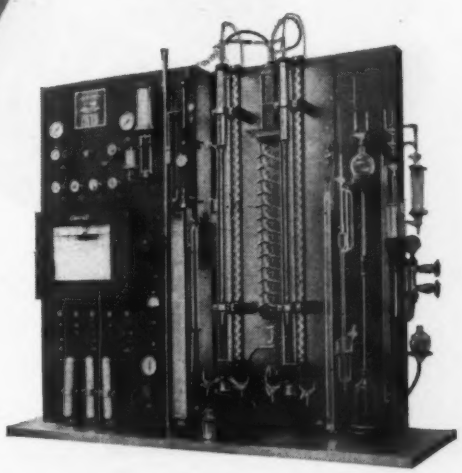
With a background of more than 10 years of outstanding service in process work, throughout industry, the *ElectroniK* Recorder is now rapidly gaining recognition as a valuable component of precision laboratory equipment.

In research *and* analytical work, its unique versatility makes it a "natural" for literally thousands of different applications . . . limited at the present time only by the speed with which alert manufacturers learn to take advantage of its remarkable sensitivity, great accuracy, unusual ruggedness and complete dependability.

Bulletin B 15-10, now available, describes the adaptability of the measuring circuit, the input circuit and the amplifier of the *ElectroniK* Potentiometer. Write for your copy, or call in your local Honeywell engineer for a discussion of your specific application . . . he is as near as your phone.

Minneapolis-Honeywell Regulator Co., *Industrial Division*, 4488 Wayne Ave., Phila. 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

The Turner-Burrell Fractionator, with *ElectroniK* Recorder, used for analyzing light hydrocarbon mixtures. *Write for Data Sheet 10.16-6.*



The Podbielniak Analyzer, with *ElectroniK* Recorder, used for recording and controlling a variety of distillation variables. *Write for Data Sheet 12.6-1.*

The Perkin-Elmer Infrared Spectrometer, with *ElectroniK* Recorder, used for plotting absorption intensity vs. molecular vibration frequency. *Write for Data Sheet 10.16-4.*

FOR THE PETROLEUM INDUSTRY

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

Cummins® Custom-built Diesels

Built not once

but Twice

The better-built engine for more profitable power

Yes, they're actually built *twice*. That's what makes a lightweight, high-speed Cummins Diesel such an efficient, dependable, precision-made engine. After initial assembly, each engine is run-in on the test block. Then it is torn down and carefully re-inspected—after that it is re-assembled and tested *again* to assure *peak performance.*

The finest of engine craftsmanship . . . exclusive Cummins fuel system . . . engines that are "custom-built to fit the job" . . . make a Cummins Diesel *a better buy for your power needs.*

Contact your Cummins dealer. He has more facts to show you about making more profits with

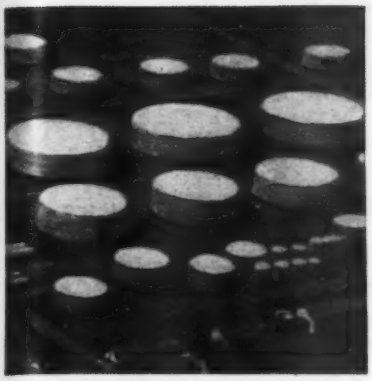
Diesel power by CUMMINS

TRADEMARK REG. U. S. PAT. OFF.

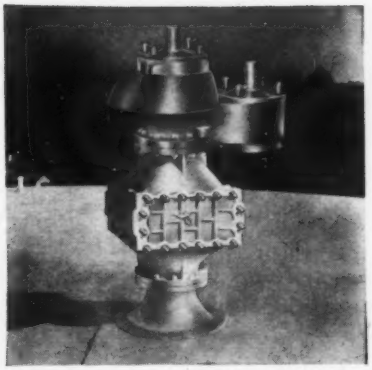
CUMMINS ENGINE COMPANY, INC. · COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. · Cable: Cumdiex

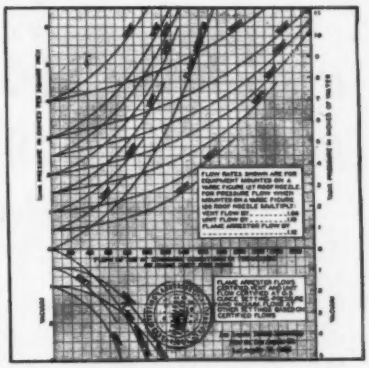
Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks · off-highway trucks · buses · tractors · earth-movers · shovels · cranes · industrial locomotives · air compressors logging yarders and loaders · drilling rigs · centrifugal pumps generator sets and power units · work boats and pleasure craft.



1. ***Determine your requirements.***
Calculate maximum gas flow for each tank with A.P.I. Proposed Standards, "VAREC" Venting Formula, or other accepted method.



2. ***Select the proper equipment.***
Consider maximum tank working pressure and vacuum for optimum valve settings, materials of construction for corrosion problems, extra fire precautions, etc.



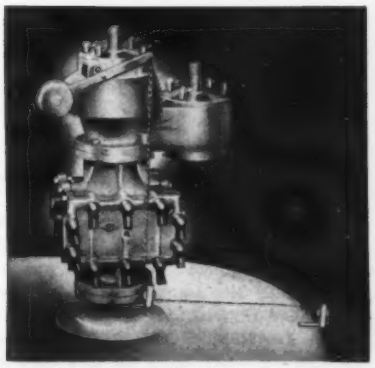
3. ***Buy extra flow capacity.***
Size your valves on the basis of certified flow capacity. Take advantage of extra capacity in "VAREC" Vent Valves and Units.

How to get the best tank venting equipment

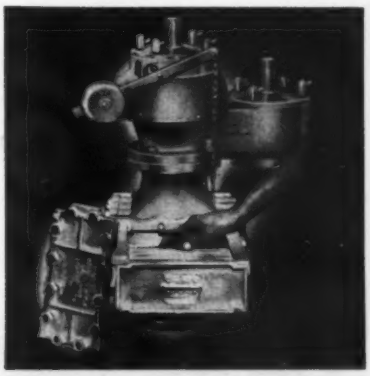
When you follow the five illustrated steps, you can be sure of having the safest and least troublesome tank venting installations.

To help you with this, "VAREC" Engineers stand ready to aid in determining your tank venting requirements; ready to aid in selecting the proper equipment; and ready to help you with any special tank venting problems as well.

When your venting standards are established by your own engineering department, make sure that literature on "VAREC" Venting Equipment is on hand. "VAREC" Bulletin CP-2000 describes the design of the new Figure No. 2000 Series Conservation Vent Valves for greatest venting capacity. The various Vent Valves and Vent Units for different venting problems are fully illustrated. Write for your copy or call in a "VAREC" sales engineer today.



4. ***Install Properly.***
Use "VAREC" Mounting Nozzles or Nipples to insure full-flow foolproof installations; also "VAREC" Snuffer Pulleys to eliminate a makeshift installation.



5. ***Maintain Regularly***
Inspect regularly to insure continued trouble-free operation. All significant and working parts of "VAREC" Vent Valves and Flame Arresters are readily accessible for easiest inspection and maintenance.

PROVED and APPROVED "Varec"

THE VAPOR RECOVERY SYSTEMS COMPANY
COMPTON, CALIFORNIA, U. S. A.
Cable Address: VAREC COMPANY USA (All Codes)
New York — Boston — Pittsburgh — Chicago — Detroit — St. Louis — Houston
Tulsa — Casper, Wyo. — Provo, Utah — Los Angeles — San Francisco — Seattle

P-18

XUM

Never Before SUCH POWER . . .
Never Before SUCH VALUE . . .
in Chevrolet P•L Advance-Design Trucks

America has learned to expect the most from Chevrolet. And now the line that outsells all others brings truck users still more: More power—to make light of maximum loads. More value—to make sure of minimum costs.

Everywhere—on every kind of job, every kind of road—these new P•L models are proving themselves the greatest of a great line. Yet Chevrolet trucks are notably low in price and in operating and maintenance costs. No wonder that year after year Chevrolet trucks are the Nation's Favorite!

CHEVROLET MOTOR DIVISION, *General Motors Corporation*
DETROIT 2, MICHIGAN

LEADING WITH ALL THESE PLUS FEATURES:

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the Improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

CHEVROLET
P*•L*
ADVANCE-DESIGN TRUCKS

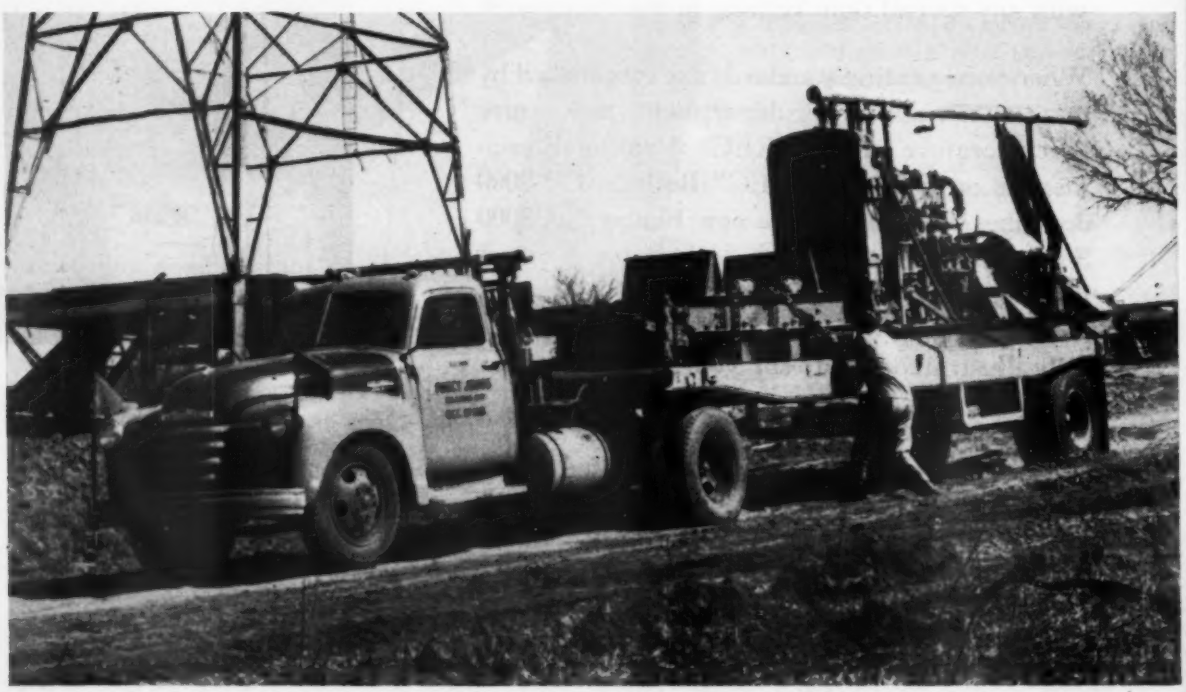
P*opularity L*eaders
Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—*proof* of the owner satisfaction they have earned throughout the years.

P*erformance L*eaders
The new Chevrolet P•L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

P*ayload L*eaders The rugged construction and all-around economy of Chevrolet P•L trucks cut operating and repair costs—let you deliver the goods with real reductions in cost per ton per mile.

P*rice L*eaders The Chevrolet truck line is the very lowest priced line in the field—saves on initial cost. What's more P•L trucks give owners dollar and cents savings in maintenance and operation.

CHEVROLET



S&J Two heads are better than One!

MINNEAPOLIS Honeywell

BROWN *ELECTRONIK*

When two minds are running in the same channel, chances are that the combined creative genius will come up with something better than when working alone. The new S. & J. Electronic Precision Remote Reading Tank Gauge and Temperature Indicator is a case in point.

This new system combines the electronic experience of the Brown Instrument Division of Minneapolis-Honeywell Regulator Co. with the tank gauging background of Shand & Jurs. Combining the Brown Continuous Balance Electronik unit, of which thousands are in service in the oil industry, with Shand & Jurs Automatic Tank Gauges, of which there are like thousands in service, has produced a remote reading gallonage and temperature gauge which has been accorded immediate acceptance.

Both of the principal components of this new gauge are so well known in the petroleum industry that those familiar with both instruments immediately favored and understood the advantages of the combination. Both are time tested, proven units, together they bring new standards of accuracy, safety and economy to a great industry. May we send you our new bulletin on Electronic Gauging and Temperature Reading?

The S. & J. Remote Reading Tank Gauge and Temperature Indicator, shown above, gives an instantaneous measurement, accurate to within 1/8 inch; and an accurate temperature reading—both on the same dial, both by the simple operation of switches. It brings new conceptions of accuracy, speed, safety and gauging economy to the petroleum industry.

The Brown ELECTRONIK unit which transmits and records the gallonage and temperature measurements, employs the Wheatstone Bridge principle of continuous balance. The unit operates on 7 volts A.C. which means low cost wiring materials and installation cost.

SHAND & JURS CO.

BERKELEY · CALIFORNIA

NEW YORK CHICAGO HOUSTON TULSA LOS ANGELES SEATTLE VANCOUVER MONTREAL

SHAND & JURS

XUM

REPUBLIC NATIONAL BANK of Dallas

Statement of Condition, June 30, 1950

RESOURCES

Cash and Due from Banks	$122,289,145.55
U. S. Government Securities	77,578,964.52
State, Municipal and Other Securities	2,172,939.32
Stock in Federal Reserve Bank	825,000.00
Loans and Discounts	178,448,728.68
Bank Premises and Equipment	2,340,323.11
Real Estate for Bank Expansion	2,368,664.00
Acceptances—Customers Account	3,175,476.04
TOTAL	$389,199,241.22

LIABILITIES

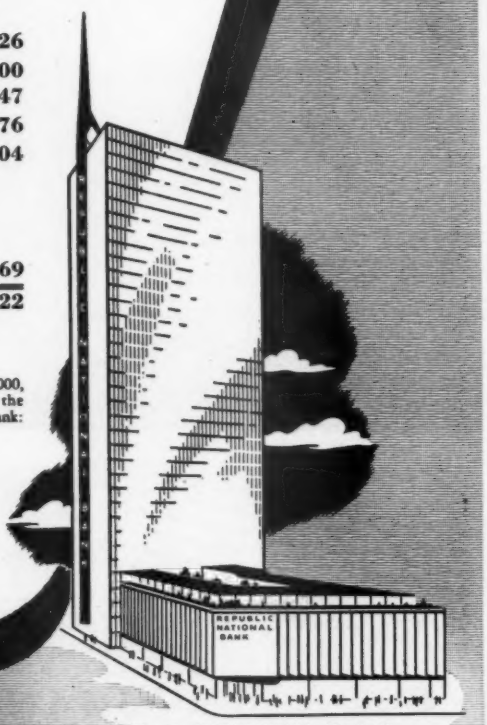
Capital		$ 13,500,000.00
Surplus		14,000,000.00
Undivided Profits		3,042,906.26
		$ 30,542,906.26
Reserve for Dividend Payable July 1, 1950		337,500.00
Reserve for Contingencies		2,505,019.47
Reserve for Taxes, Etc.		1,491,981.76
Acceptances—Customers Account		3,175,476.04
Deposits:		
Individual	231,446,377.89	
Banks	113,957,756.19	
U. S. Government	5,742,223.61	351,146,357.69
TOTAL		$389,199,241.22

★ ★ ★

The assets of the Republic National Company, including its capital stock of $3,000,000, are not included in above statement. The Company owns controlling stock in the following banks located in Greater Dallas, all affiliated with the Republic National Bank:

FAIR PARK NATIONAL BANK
GREENVILLE AVENUE STATE BANK
HIGHLAND PARK STATE BANK
LAKEWOOD STATE BANK
NATIONAL CITY BANK
OAK CLIFF BANK & TRUST CO.
OAK LAWN NATIONAL BANK

Deposits of the Republic National Bank and Affiliated Banks aggregate $440,254,489.60

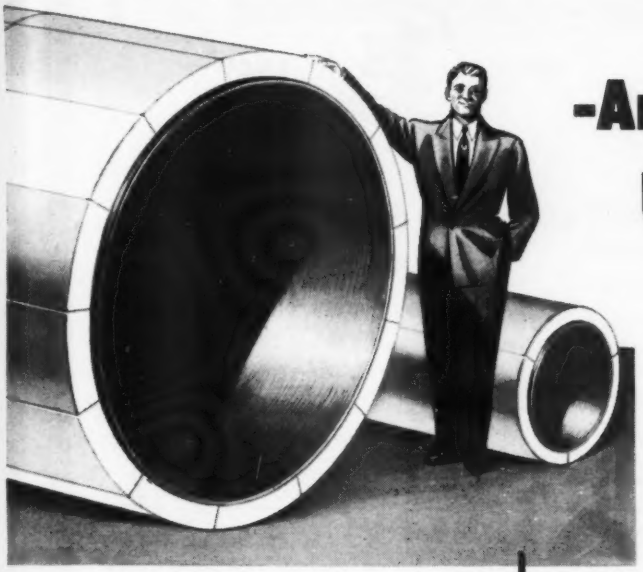


New REPUBLIC NATIONAL BANK Building
—Scheduled for completion, Fall 1952

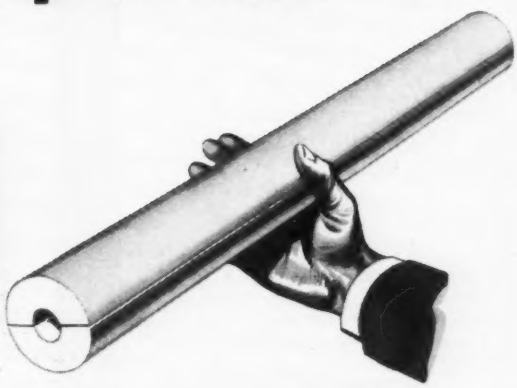
Republic NATIONAL BANK

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

ONE PIPE INSULATION FOR PIPE SIZES ½ TO 72 INCHES



-And Temperatures Up to 1200° F.



SECTIONAL
Pipe sizes from ½" to 12".

TRI-SEGMENTAL
Pipe sizes from 8" to 23".

QUAD-SEGMENTAL
Pipe sizes from 19" to 41".

18" NOMINAL

K-SEGMENTAL
For pipes, vessels or tanks from 38" to 72" in diameter.

KAYLO PIPE INSULATION is produced in Simplified Dimensional Standards of thicknesses, diameters and shapes for snug nesting, when necessary. O. D.'s of insulation correspond to O. D.'s of standard pipes. All sections are 36 inches long. Single-layer thicknesses range from nominal 1" through 4".

Here is one proved pipe insulating material that is efficient throughout a wide temperature range—up to 1200°F. Kaylo Pipe Insulation is a calcium-silicate material which is highly resistant to damage from water vapor or moisture. It retains its dimensional stability and efficiency in long service. It is not a glass product.

Kaylo Pipe Insulation is available for pipe sizes from ½ inch to 72 inches. It is made to close dimensional tolerances to assure proper fit for each pipe size and for all operating conditions. Higher strength and lighter weight make it easier to handle and apply.

It will pay you to investigate all of the advantages offered by Kaylo Pipe Insulation. Get the facts now.

KAYLO®

PIPE INSULATION AND HEAT INSULATING BLOCK

OWENS-ILLINOIS GLASS COMPANY
Kaylo Division • Toledo 1, Ohio

SALES OFFICES
Atlanta • Boston • Buffalo • Chicago • Cincinnati • Houston • Minneapolis • New York
Oklahoma City • Philadelphia • Pittsburgh • St. Louis • Toledo • Washington

SEND COUPON FOR KAYLO HEAT INSULATION LITERATURE

OWENS-ILLINOIS GLASS COMPANY
Dept. N-83, Kaylo Division • Toledo 1, Ohio

Gentlemen: Please send me descriptive literature on Kaylo Heat Insulation.

NAME.....

FIRM.....

ADDRESS.....

CITY.....STATE.....

XUM

They Say—

Cartoon Request

Sir:

Our company has recently commenced publication of a house organ which is distributed to our employes.

The Oil and Gas Journal contains some excellent cartoons which seem to fit our needs exactly.

I would greatly appreciate your courtesy in informing me of the restrictions which are imposed upon their reproduction.

W. M. Wonsettler, superintendent
Public Relations
South Penn Oil Co.
Bradford, Pa.

Permission to reproduce a number of the cartoons granted. Credit to the Journal, of course, will be appreciated.—Editor.

Quality Up, Price Down

"In the three decades between 1919 and 1949, the cost of refining equipment—per barrel per day of throughput—increased 900 per cent; and overall processing expenses rose 260 per cent. The cost of exploration, production, transportation, and distribution increased correspondingly.

"Despite the greatly increased labor and material costs, the average service-station price of regular-grade gasoline, ex tax, was 25 per cent lower in 1949 than in 1919 and the octane quality was improved from 45 to 83—an increase in antiknock effect of over 200 per cent.

"So far this year the octane rating has risen two more numbers to 85, and despite the fact that each of the last octane numbers has been not only bigger, but harder and more expensive to obtain, the national average price of gasoline to motorists, exclusive of tax, during the month of May was actually lower than the average 1949 price."

J. H. Doolittle, vice president, Shell Oil Co., addressing American Petroleum Institute lubricants committee, Detroit.

In the Middle

"The public has heard from some leaders of labor that management is so busy feathering its own nest—and the nests of the owners—that it has little time or inclination to look out for the public good. So these labor leaders have asked for a strong hand in management's province in order—they say—that both labor and the public may be better served.

"Some of those in government likewise have cited the 'public interest' as the reason for the elimination of private management from the indus-

1895 1st of Tulsa 1949

STATEMENT OF CONDITION

June 30, 1950

RESOURCES

Cash and Due from Banks	$53,805,056.26	
U. S. Government Securities	72,698,210.90	$126,503,267.16
Other Bonds and Securities		7,411,657.31
Loans and Discounts		58,272,567.47
Federal Reserve Bank Stock		240,000.00
Income Earned, Not Collected		451,324.22
Future Banking Quarters		1.00
Equipment—New Banking Quarters		340,791.63
Furniture and Fixtures		1.00
Customers' Liability Under Letters of Credit		631,062.50
Other Resources		29,148.77
		$193,879,821.06

LIABILITIES

Deposits		$181,747,411.20
Income Collected, Not Earned		298,146.63
Taxes, Interest and Expense—Accrued		537,969.06
Letters of Credit Outstanding		631,062.50
Capital	$3,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	2,665,231.67	10,665,231.67
		$193,879,821.06

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President, Warren Petroleum Corporation

THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

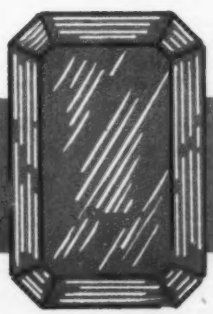
The Bank of Today in the Building of Tomorrow

Just as the famous First of Tulsa service is something special, our new home to be dedicated this month is something special. Its complete freedom and simplicity of style characterize the Southwest's policy of "Building for Tomorrow."

You are cordially invited to attend our "New Home Dedication" ceremony to be held on our *Emerald Anniversary, July 29.* This dedication ceremony will find the bank of today dedicated to the building of tomorrow. Building for Tulsa . . . for the Southwest . . . and for our clients.

Fifth Street at Boston Avenue

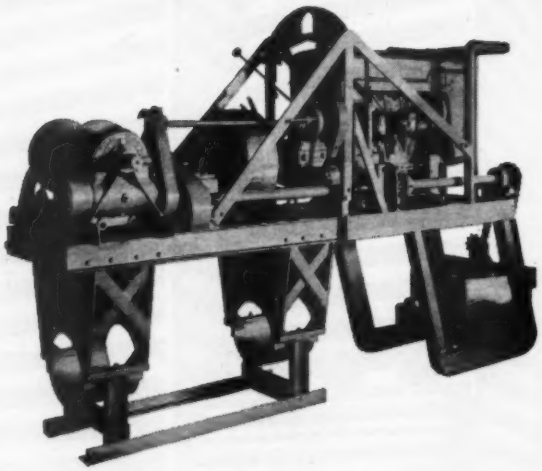
THE FIRST NATIONAL BANK
AND TRUST COMPANY OF TULSA



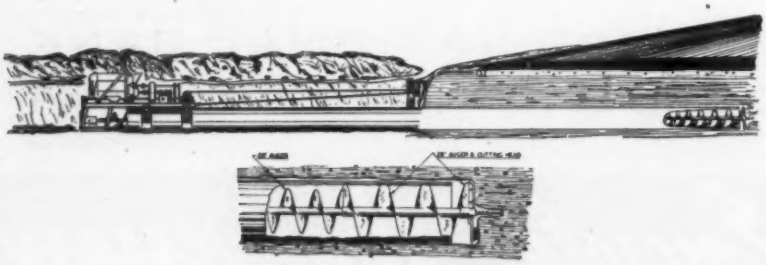
Emerald Anniversary
1895 - 1950

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

XUM



CROSE AUGER TYPE ROAD BORING MACHINE installs pipe casing up to and including 34" in diameter. This machine has proven highly satisfactory with Pipe Line Contractors for the fastest method of installing pipe casing where rock is not encountered. Machines for installing casing larger than 34" in diameter are also available.



M. J. CROSE
MANUFACTURING COMPANY, INC.
2715 Dawson Road TULSA, OKLA. Phone 6-2173

trial picture. In so doing they have portrayed management as inept, selfish, dishonest, and a general monkey-wrench in the wheels of progress.

"Management cannot divide—let alone surrender—its prerogatives with any special group, any more than it can with any of the other groups that serve demands on business."

T. S. Petersen, president, Standard Oil Co. of California, addressing National Industrial Advertisers Association, Los Angeles.

Looking Ahead

"It should be remembered that we have had two light winters, and there is always a chance that a cold winter will come along and require much more heating oil. We must not allow ourselves to be caught short of heating oil, and I make an appeal to the oil industry at this time, now while there is plenty of time to build up their stocks of heating oil, so that the industry will not be assailed in the Congress this winter for being short of heating oil.

"We have plenty of oil in our fields to be produced. We have the ability to produce it. It is up to the oil industry to see that we are not caught short by reason of their not storing it up this summer before the winter comes."

Ernest Thompson, Texas Railroad Commission, speaking in Odessa, Tex.

Fuel Energy Producers

"It is a startling fact that the only substantial increase in the production of energy producing materials since the wartime peak of 1918 is crude oil and natural gas. Coal has been the leading energy producer, but it is rapidly losing its dominant position to other hydrocarbons, if it has not already done so.

"In 1918 the domestic coal industry produced coal equal to 17,868 trillion B.t.u. After sinking to 9,470 trillion B.t.u. in 1932, the industry reached a new all-time high of 17,966 trillion B.t.u. in 1944—only a little more than in 1918.

"Domestic crude oil produced in 1918 provided 2,136 trillion B.t.u. The depression low was 4,711 trillion B.t.u., more than double the peak of 1918, and the 1947 high was 11,300 trillion B.t.u. While coal barely topped its 1918 production, crude oil was five times its 1918 output.

"Natural gas has shown advances proportionally even greater than crude oil, its 1947 production of 5,000 trillion B.t.u. being more than six times its 1918 output.

"Water power, the least important of the four sources of energy, in 1947 showed a little more than double its 1918 output.

"It is curious that coal, which provided about 80 per cent of our national fuel energy in 1918, is now

producing about half of it. There is a large potential supply of coal, the industry is mechanized to a major degree, and transportation facilities are adequate. But for many years the coal industry has lost ground to oil and gas."

Pure Oil News, Pure Oil Co.

For Four Cents

"What can you buy for 4 cents these days?—one pound of gasoline, representing enough liquid power to provide about 2½ miles of travel in the average motor car. One pound of gasoline—cost about 4 cents—will carry a commuter to the station, takes his children to school, or enable his wife to go marketing.

"But what will 4 cents buy at the grocery store? About one-third of a loaf of bread, one-sixth of a pound of green beans, half a pound of apples, or less than a half pint of milk! . . .

"When a farmer sells a bushel of wheat (cash price $2.19) he can buy about 4 lb. of bacon—or about 60 lb. of motor fuel for his automobile, truck, or tractor.

"It is obvious that 4 cents won't go far toward feeding a hungry family, but it will go quite a distance if exchanged for one of the 'best buys' on the commodity market, gasoline for the family car."

American Petroleum Institute.

For a National Policy

"The outlook for oil and gas never was better. Interior Department officials tell us there are enough known oil reserves in the Western Hemisphere to fuel the national economy even on a war footing—a jet-propelling one at that.

"Natural gas is inching its way across the nation. Texas gas will soon be boiling water in Bangor. At the same time, the bottom is about to fall out of the nation's coal hod. This does not look serious on the surface. Self-started fueling is altogether in keeping with the modern trend of things.

"The catch is that over 95 per cent of the nation's known fuel reserves are locked up in our 2,000-year store of coal. Can we afford to leave the oil tap open at the presently accelerated rate? And be sure it would keep running should there be another 5-year war emergency?

"Impartial fuel economists here would like to see congressional proposals for a coal-industry investigation broadened to encompass a study of all the nation's fuel resources. What is most needed, they assert, is a coordinated fuel policy to insure that the country makes the best use of its uneven fuel resources in any future emergency."

Editorial in the Christian Science Monitor.

For top Performance at the bottom of the well

For over 55 years, wherever petroleum has been recovered by mechanical means, Axelson balls and seats have given maximum production with less down time under all well and pumping conditions.

Each perfectly spherical ball is lapped and mated with its own seat and vacuum tested – then wrapped together in a sealed container to insure your getting *perfect* action in pumping service. Axelson seats are reversible, giving longer operating life.

You can argue quality at the surface but it's proved at the bottom of the well

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

WRITE FOR BULLETINS ON: Sucker Rods and Couplings, Pump Liners, Pump Plungers, Balls and Seats, Specific Deep Well Plunger Pump Assemblies, Long Stroke Pumping Units, Pumping Accessories.

AXELSON PETROLEUM PRODUCTION EQUIPMENT

AXELSON PETROLEUM PUMPING EQUIPMENT

Ask Axelson experts for practical answers

AXELSON MANUFACTURING CO. • PLANTS – Los Angeles 58, Los Nietos 14 • OFFICES – New York City 17, Tulsa 14, Houston, Kilgore, Caracas, Venezuela • DISTRIBUTORS – Principal Cities

XUM

What's Most Important to YOU in a BRIDGING PLUG?

EASE OF RUNNING? *You Get It Here!*

Lane-Wells Drillable Bridging Plugs are run either on the conductor cable of the Lane-Wells Service Truck, or on your own wire line, or, if you prefer, on tubing.

SAVING TIME? *You Get It Here!*

No pumps to hook up, no waiting for cement to set! You have secure packoff in a matter of seconds.

LEAK-PROOF PACKOFF? *You Get It Here!*

Lane-Wells Plugs have been tested to hold against differential pressures as high as 10,000 psi, at temperatures up to 300°F.

PERMANENCE? *You Get It Here!*

These plugs will outlast the casing in permanent installations.

DRILLABILITY? *You Get It Here!*

You can drill out, or knock down Lane-Wells Drillable Bridging Plugs with either rotary or cable tools, in from 4 to 6 hours.

You Get them All with

AU-304

LANE TECHNICAL OILFIELD SERVICES WELLS

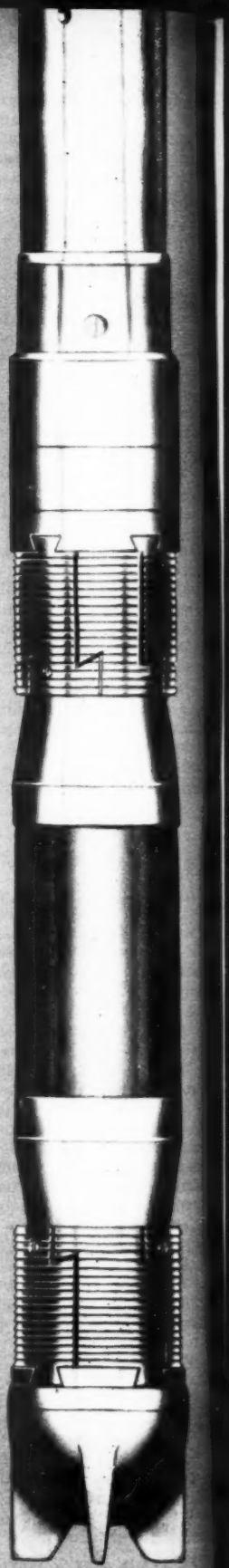
DRILLABLE BRIDGING PLUG

Ask Your Lane-Wells Man!

LOS ANGELES • HOUSTON • OKLAHOMA CITY

General Offices, Export Office and Plant • 5610 SO. SOTO STREET, LOS ANGELES 58, CALIFORNIA

LANE WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA



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XUM

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JOURNALLY Speaking

The Girls, Again

EVERY editor likes to brag about a scoop. Now one of this department's exclusive predictions of things to come has fructified into an actuality.

We believe we can say without fear of successful contradiction that we were the first weekly oil publication of international circulation to predict that the Desk and Derrick Club of New Orleans might some day become a national organization of the distaff side of the oil industry. That was only about a year ago, very shortly after the secretaries in the New Orleans offices of some of the oil companies had formed the then embryonic organization.

It looked like a comer to us, so we went way out on a limb and predicted the outfit would go places. It has. Last month we had the pleasure of reporting on its very active status at the end of its first year of life.

Now comes further proof of our prophetic perspicacity. The New Orleans group is taking the necessary legal steps to become a national organization, both for the protection of itself and the oil industry, since chapters are being formed steadily in other cities, the latest being in Los Angeles.

This emboldens us to make another prediction, namely: If the oil gals in other cities show half the steam of those in New Orleans, the National Desk and Derrick Clubs will be a real factor in the oil industry before many moons roll around.

Dogged Delivery

AS if we didn't have enough trouble getting our favorite oil publication delivered promptly, what with the shorthandedness of the postal service, it now develops that we are further handicapped by the standing fued between mail carriers and dogs.

To test delivery of our June 22 issue—the one with the Gulf Coast map in it—our circulation department sent postcards to sample subscribers in various cities. One man in Midland, Tex., replied that he did not receive his copy until Tuesday, though we think he should have got it the previous Friday.

But that isn't the half of it. Under "Remarks" he wrote: "Chewed by dog on one corner. Map punctured by dog teeth. Carrier placed mail on porch floor. Neighbor's pup was chewing vigorously when I rescued the Journal."

Yup, the mail service sure is going to the dogs.

Postal Protocol

WHILE we're picking on the Post Office Department, here's 'another instance which illustrates something or other about the workings of bureaucracy.

The Tulsa Post Office is just across the alley from the Journal's office. We give it quite a bit of business, and maintain a large lock box there so we ought to be fairly well known. The other day somebody over there, needing to communicate with us on official business, wrote simply "Oil and Gas Journal" on a penalty envelope. Some where in the big, gray Federal Building another clerk stamped "Insufficient Address" on the envelope, and presumably routed it toward the dead-letter office. What happened after that is a mystery, but it finally got to us without any more address than it had the first time.

There must have been some green hands the other side of the alley.

Teaser

HOW many wells do you think the oil industry will drill in 1950? Are you still bothered by the gloomy reports which were circulating a few months ago, the rumors of drilling rigs stacked and curtailment of activity by unidentified big operators? For a pleasant surprise, look at the more than 30 pages of reviews and forecasts in our Midyear Report issue next week. We won't tip our hand further than to say that the issue will be very revealing.

—*Henry D. Ralph*

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Pricing Policy

Probably no practice in the oil industry brings more suspicion than the uniformity of retail prices within a consuming area. There have been investigations in Washington, including those under way at this time, whose only background is that a legislator or administrator felt that this uniformity was proof of illegal collusion among sellers.

Actually there is not the uniformity that many assume to exist, but it is true that the bulk of petroleum products meeting standard specifications does sell to wholesalers and ultimate consumers at the same delivered prices. However, as most fair-minded investigators have found out, this does not indicate the absence of competition.

Back of the jobber is the competition that starts with exploration and extends through drilling, production, refining, and transportation. Those who survive obviously must arrive at final costs comparable with those of competitors. In the sale by refiners to jobbers and by jobbers to dealers the need of operating margin plus profit is recognized, and competition does not permit much variance in those items.

Probably the greatest factor in uniformity of price is the almost identical quality of petroleum products of all manufacturers. Practically all products have to meet the rigid specifications of consumers, including federal and state governments. The extra values of quality and service offered by some companies usually are not sufficient to permit the producers to carry prices appreciably above the general level. This in itself is evidence of the competitive nature of the market. In petroleum there are no variations in quality comparable to those which permit wide differences in prices of many consumer items, such as men's suits.

Despite this background, some of the major companies are seeking methods of allaying all suspicion. Standard of Indiana for years had an area pricing policy, based on costs, which was fair to its jobbers and dealers and to their customers.

A year ago it adopted a policy of meeting local competition with local prices. It discontinued public announcement of price changes at that time. This reflected an attitude of some courts that the announcement of new prices was an "invitation" for competitors to follow suit.

The Indiana company recently reiterated this new policy, emphasizing the fact that its employes are not permitted to make public announcements of price changes. There is a limit to what the oil companies can and should do in trying to satisfy some critics, and it would seem that the Indiana company has gone the limit.

The oil business has an enviable record in regard to its prices, based on any tests that can be made. What has been done is in the interest of ultimate consumers, and their interest should not be jeopardized in attempting to conform to senseless attitudes of the uninformed.

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THIS WEEK

REFINING—Standard of California awards contract for worlds' largest vacuum-flashing unit to M. W. Kellogg Co. as part of modernization program at Richmond, Calif., refinery. . . . ¶New Platforming unit planned by Premier Petroleum Co. at its Fort Worth refinery will be Texas' first. . . . ¶Union Oil Co. to construct new $1,000,000 asphalt refinery near Edmonds, Wash. . . . ¶Solvent lubricating-oil plant now on stream at Ohio Standard's Lima refinery. . . . ¶Texas Co. using new furfural process in a commercial unit. . . .

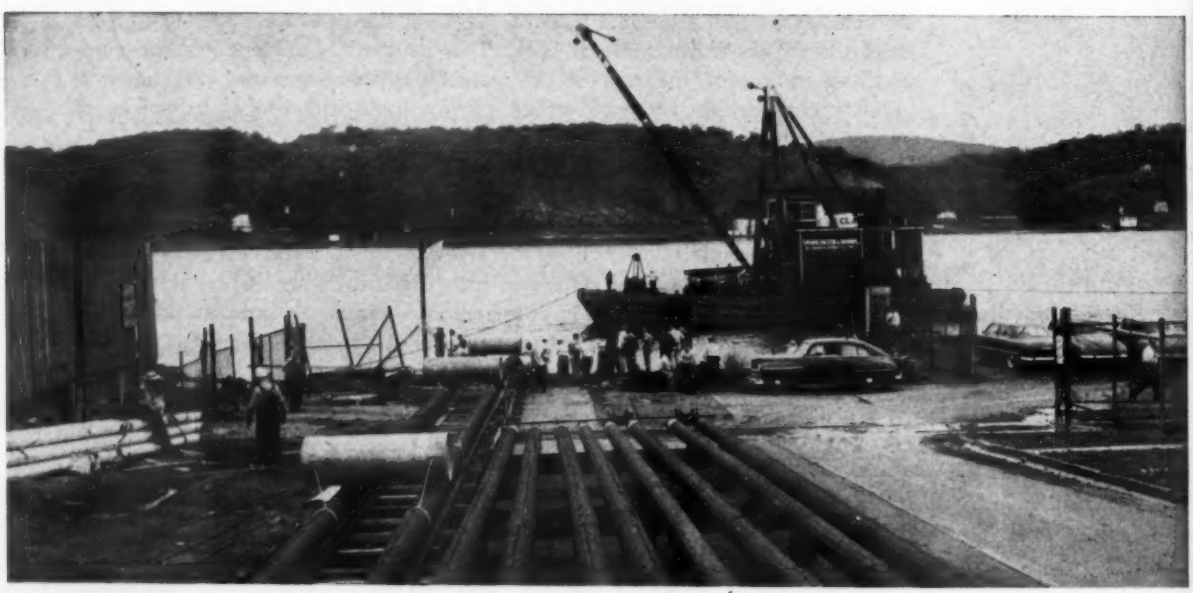
INTERNATIONAL—First offshore well in Europe now being drilled as joint venture in mouth of Elbe River. . . . ¶Venezuela, Saudi Arabia report new production records during June. . . . ¶London reports say source of crude oil for Haifa refinery will be Qatar. . . . Oil to be shipped around Africa. . . . ¶British equipment manufacturers look on sterling deals of American companies as big opportunity. . . . Capacity to produce is question.

GOVERNMENT—Federal Power Commission rescinds Order 139, indicating intentions to extend jurisdiction over independent producers. . . . ¶Senate rules committee authorizes 6-month study of gasoline-pricing policies. . . . ¶Interior committee preparing bill asking exhaustive study of all energy sources. . . . Would be basis for proposed national fuels policy. . . . ¶Government officials tell industry Korean conflict will not result in immediate upsurge in demand for oil and its products. . . . ¶Neely files report condemning imports but asks no action now. . . . ¶Bill extending synthetic-fuels program another 3 years and providing additional $25,000,000 starts trip through Congress. . . .

PIPE LINES—FPC approves long-pending application of El Paso Natural to build 451-mile, 24-in. line to carry San Juan basin gas to Arizona-California border. . . . Pacific Gas & Electric given authority to increase capacity of its system in order to handle additional gas from El Paso. . . . ¶Service Pipe Line revises tariff to eliminate minimum tender, cut deduction for handling losses, provide for segregation of different crudes. . . . ¶Shell places in operation its new remote-control system for operating Wood River-Lima products line. . . .

ACTIVITY—Crude production for week ended July 15 averaged 5,403,425 bbl. daily, down 4,525 bbl. daily from previous week but up 749,500 bbl. daily from same week last year. . . . Well completions for the week totaled 821 compared with 908 for previous week and 703 for same week in 1949. . . . Wildcat completions increases to 165 wells from 158 previous week. . . . Rotary rigs operating in United States on July 10 decreased to 2,203 rigs from 2,242 a week earlier. . . .

TRENDS—Refinery runs reached all-time peak of 5,912,000 bbl. daily for week ended July 8 following a near record for week of July 1. . . . Stock increases for four major products averaged 207,000 bbl. daily more for 2 weeks ended July 8 than for 3 previous weeks. . . . Refinery runs for the 2 weeks were up 308,000 bbl. daily, indicating increased demand at refineries. . . .



FIRST TO CROSS HUDSON.—This was the view from the Poughkeepsie, N. Y., shore as Central Hudson Gas & Electric Corp. began pulling into the water the first natural-gas pipe line ever to cross the Hudson River. At the left may be seen two 8-in. lines entering the water, guided by the barge-mounted derrick in the background. The crossing from Poughkeepsie to Highland, on the opposite shore, closed the last gap in the company's 40-mile, $2,000,000 line which will bring gas from Columbia Gas System's line near Tuxedo, N. Y., to such communities as Newburgh, Kingston, Beacon, Saugerties, and Poughkeepsie. Three days were required to make the crossing, which was completed July 8.

All-Fuels Investigation

Interior committee will ask congressional authority for exhaustive study of all energy sources; Chapman favors it

WASHINGTON. — The Senate interior committee is readying legislation providing for an exhaustive study of all types of energy—coal, oil, natural gas, and water power—after hearing from Interior Secretary Oscar L. Chapman last week that a study of the coal situation alone, as proposed by Sen. Joseph C. O'Mahoney of Wyoming, would not provide the basis for a national fuel policy.

Chapman told the committee he favors the over-all investigation proposed by Sen. Francis J. Myers of Pennsylvania because individual elements of our energy economy do not function independently and perhaps as much as 90 per cent of our energy supplies are consumed in uses where substitution of one fuel for another is possible.

The only significant uses in which substitution is not now feasible are gasoline for transportation, coking coal for blast furnaces, and natural gas for carbon black and glass manufacture, Chapman said, and even gasoline may become vulnerable to substitutes if synthetic-liquid-fuel production is put on an economic basis.

Look at the future.—"The lesson of the past is that because of substitution among fuels, the problems of any energy industry cannot be studied in isolation, but only in conjunction with all other energy industries," the secretary said after outlining the effects on coal of the expansion of oil and natural gas.

"However, the past does not tell us what the future trends in the energy industries will be. Nor does the simple record of the past tell us whether the economy would profit in war or peace, if these trends were to continue unchanged into the future.

"Numerous influences, not formerly at work, will operate upon the energy industries in the future. Technical changes in energy production and use of first importance may emerge.

"These include the possible commercial success of revolutionary processes for converting coal to liquid fuels, for producing gas by burning coal in the ground and for conversion of this gas to electric power at the mines. The production of oil from shale shows promise of becoming commercially attractive. Techniques may be perfected for harnessing atomic energy for the production of useful power. The distances over which low cost hydro-electric power can be transmitted may be greatly broadened. New and revolutionary machines may be developed for mining coal, thus greatly increasing the productivity of the coal-mining industry, and new burning techniques may be devised that will bring about greatly increased efficiency and substantially lower costs in burning coal. At the same time the relative depletion of our several mineral fuel resources will be proceeding at highly different rates."

Along this line, Chapman cited the expanding dieselization of the railroads and pointed out that to know whether the growth in the use of diesel fuel might be expected to continue in the future it will be necessary to investigate the sufficiency of domestic oil reserves and the possibility of increased oil prices if supplies become tighter with the passage of time, the prospect of developing radically new coal-burning locomotives which would be as efficient for diesels, the possibility for an indirect increase in coal use by railroads as a result of commercial production of synthetic liquid fuels, the possible growth of railroad electrification as hydroelectric power is more fully developed, etc.

Need for study cited.—"An inquiry of the sort that I have been discussing is essential if we are to have available the objective facts which will be indispensable in helping to shape the future programs and policies of government, industry, and labor in this field," Chapman said.

"I do not think that it is sound for us to consider without having available the results of exhaustive investigation measures which will arbitrarily reverse any of the trends which I have been discussing or which would provide protection for any particular segment of the energy industry at the expense of other segments, and at the ultimate expense of the people. Further, it would be my hope that we would try to find answers to the vexing problems which confront us in the energy economy within the framework of our system of free competitive enterprise."

Myers also urged that the investigation cover all fuels, pointing out that while we know a great deal, individually, about each of the major energy-producing industries, very little has been done to work out a basis of comparison between them necessary to put them into perspective.

"As I see it," Myers told the committee, "the job which really needs to be done is to work out a basis of comparison between our several energy sources. I believe this can be done only by a thorough-going study of the entire fuel picture in terms of the trends in fuel tastes up to the present time and by an estimate of the direction these trends will take in the future. I believe we must examine carefully, in terms of these projected future needs, the reserves which we have of the various energy sources. This must be done with a watchful eye cast at our national security needs, as well as our future needs for a growing national economy."

No Hurry for Oil

Sudden demand jump not expected as result of war

WASHINGTON.—Defense and Interior officials told the oil industry last week not to hurry to open up well valves in anticipation of a sudden upsurge in military demand.

They indicated that the Korean situation will have to develop along much broader lines before anything like a mobilization of the oil industry will be in order.

But at the same time it was reported that the Navy, which was seeking bids a couple of weeks earlier on two cargoes of aviation gasoline, had increased its requirements by 17 cargoes, of which 11 would be loaded in the Gulf and 6 on the West Coast.

The Korean situation touched off the spiral of inflation and pressure began to appear in Congress and in some administration quarters for prompt enactment of economic-control legislation on more or less of a standby basis.

There were reports that the Commerce Department is preparing to set up an iron and steel advisory committee. There was talk of a voluntary allocations plan to channel materials into military production and even return of the "controlled materials plan" of the last war, under which requirements were matched against available supplies, though there is no present legal authority for either.

Drawing on their experience in the last war, steel producers pointed out that the term "war goods" covers much more than guns, tanks, planes and motor vehicles, and includes such things as line pipe, freight cars

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and many other items that would have to be given precedence over civilian manufactures.

The framework of the emergency legislation which the President is being urged to ask Congress already is available, having been in course of drafting and refinement in the National Security Resources Board for some two years.

FPC Turnabout

Commission kills Order 139 exempting independents, tells industry it will operate reasonably and in public interest

WASHINGTON.—The Federal Power Commission rescinded its famous Order No. 139 last week, paving the way for eventual extension of control to independent producers and gatherers of natural gas.

It said, however, it does not now intend to inaugurate a general investigation respecting existing rates charged by them.

Order No. 139 was adopted by the commission in August 1947 when Congress was considering legislation to specifically exempt independent producers and gatherers from FPC control. In it, the commission said it would construe the exemption in Section 1(b) of the Natural Gas Act to apply to arm's-length sales of natural gas by independent producers and gatherers and, "consistent with this construction, will not assert jurisdiction over such producers and gatherers who might be subject to jurisdiction solely because of such sales."

The commission's action rescinding the order bore out predictions made by supporters of the Kerr bill during its consideration in Congress that defeat of the measure would be followed by efforts to have the commission expand the scope of its jurisdiction. The fear of such action has resulted in many independent operators refusing to make contracts for their gas.

Members differ. — The commission's action was unanimous, but Commissioners Harrington Wimberly and Nelson Lee Smith explained that they went along with the majority only because the order "does not accurately reflect the interpretation placed by the majority on the Natural Gas Act, and therefore the policy of the commission." The two members said they would state their views more fully in a concurring opinion to be filed later.

The order itself was signed by Chairman Mon C. Wallgren and Commissioners Thomas C. Buchanan and Claude L. Draper, who issued a statement explaining that they acted on the basis of the President's rejection of the Kerr bill.

The three commissioners referred to the President's veto message in which he said he had no doubt the commission would operate reasonably and in the public interest in carrying out the present law, and said "that is and will continue to be the policy of the commission."

Majority statement. — "It is not the intention of the commission to inaugurate a general investigation respecting existing rates charged by producers and gatherers," the statement continued. "Where, however, the sales of individual producers or gatherers have a material effect on interstate commerce and the rates therefor appear excessive, appropriate investigations will be undertaken. In this connection, the commission at present has under investigation the interstate wholesale rates of Phillips Petroleum Co., one of the largest producers of natural gas selling to interstate pipe lines.

"Upon conclusion of further studies of the operation of producers and gatherers and of the administration involved in their regulation, the commission plans to promulgate rules and regulations specifically applicable to them."

The commission's statement that it planned no general investigation was seen in some quarters as indicating a belief in the FPC that present gas prices are not too high. That, too, would be in line with the view expressed by the President in his veto message that it is only natural that prices have risen, since the interstate lines built during and since the war have widened the market for natural gas and resulted in more competition among buyers, and "this process of price adjustment will probably continue, and it is right that it should if held within reasonable limits."

Gas industry officials pointed out that Order No. 139 has been a dead issue since the commission took on the Delhi and Phillips cases. In the Delhi case, the commission first said the company was under the law, then that it was not, and finally that it didn't know.

However, these officials said, the commission's statement raises a number of questions, such as how long it will require to get out a specific statement of its position, what kind of formula it will use, the validity of escape clauses that have been incorporated in some gas-sales contracts, etc.

Coal-Conversion Plans

WASHINGTON.—Plans for converting anthracite coal waste into gas are being pushed by the coal industry in anticipation of a need for synthetic fuels within the next few years.

The Anthracite Institute, which is heading up the work, foresees need for synthetic fuels even in advance of the 1965 date set by George R. Hopkins of the National Security Resources Board in a recent projection of oil supply and demand.

Hopkins estimates that at the end of 15 years there will be a deficiency in domestic production of 2,834,000 bbl. a day, of which 2,000,000 bbl. will have to be made up by imports and 834,000 bbl. by manufacture of synthetics.

It is estimated there are approximately 150,000,000 tons of anthracite silt in waste piles that could be used for the production of gas.

Pricing Study

Six-month investigation of gasoline prices authorized

WASHINGTON.—The Senate rules committee last week approved a 6-month investigation of the oil industry's gasoline-pricing practices after learning from the Department of Justice that the inquiry, if carefully conducted, would not interfere with probes of the industry which the department now has under way.

The committee lopped $20,000 off the $50,000 asked for the study by Sen. Homer S. Ferguson of Michigan, who proposed it as a result of gasoline price increases in the Detroit area, and gave the investigating committee up to January 31, next, in which to make its report.

Action on Ferguson's resolution had been held up by the committee as a result of suggestions from Peyton Ford, assistant to the attorney general, that the department would like to study it to determine whether there would be any conflict with the department's own program.

In a letter to Ferguson, however, Ford said there would be no conflict if the investigating committee limited its investigation to the price situation, which Ferguson assured him it would.

Reportedly, Ford gave the senator a very limited description of the department's pending proceedings but no indication whether any definite actions are planned on gasoline prices as such.

It also developed that there was no question as to whether witnesses before the committee would secure immunity from antitrust prosecutions involving situations on which they testified. The possibilities of such immunity were canvassed because the department had expressed fears that the over-all investigation of the petroleum industry by the Federal Trade Commission proposed by Rep. Clar-

ence Cannon of Missouri would interfere in that way with cases which it is working on.

Imports Report

Neely disagrees on tariff, asks no immediate action

WASHINGTON.—Imports of foreign oil adversely affect domestic petroleum, coal, and railroad industries; the Tariff Commission should make a new study of the matter; Congress should take no action at this time.

These were the conclusions of the Senate committee on labor, expressed in a report filed after extensive hearings by a subcommittee headed by Sen. Mathew M. Neely of West Virginia.

Neely wanted the committee to recommend that Congress raise the import tax on crude and residual fuel oil to $1.05 per barrel. The other members of his subcommittee — Taft of Ohio and Thomas of Utah — wanted an increase but of smaller proportions. The full committee refused to go along with either.

Highlights of the committee report:

All witnesses agreed that imports of resid have an adverse effect on coal, but differed as to the extent.

It is not true, as claimed by the importers, that imports of resid merely offset loss of supplies from domestic refinery production. Refiners lost more than half a billion dollars on the sale of resid in a single year as a result of restricted markets and depressed prices.

Importers have not conformed with the policy statement of the National Petroleum Council that imports should supplement but not supplant domestic production.

It is unwise policy to curtail domestic production and depend on foreign oil. Residual imports are discouraging exploration and development work in the domestic oil industry.

When the national policy of promoting foreign trade results in unemployment and injury to domestic industries it is necessary to reexamine the policy.

Suggestions for voluntary limitation of imports are not impressive in view of "a history of continued procrastination by the importers."

Termination of the Mexican trade agreement will raise the import tax to 21 cents from 10½ cents per barrel, but this alone will not place foreign oil on a fair, competitive basis.

Relief could be obtained by executive action under escape clauses of other trade agreements but this is not expected. "It is perhaps inevitable and certainly understandable that those preoccupied with urgent problems of global concern should be somewhat insensitive to protests of domestic dislocation. Fortunately, such lack of vision is not characteristic of legislative representatives entrusted by the constitution with responsibility for the welfare of the people of the United States."

Synthetics Bill Introduced

WASHINGTON. — Legislation extending the Bureau of Mines' synthetic - liquid - fuels program for 3 years from its present expiration date to April 5, 1952, is on its way through Congress.

The measure would add $25,000,000 to the previously authorized $60,000,000 together with $2,600,000 for expansion of laboratory facilities at the experiment station at Morgantown, W. Va., for research in the production, preparation, and utilization of coal, petroleum, natural gas, and peat. It was approved last week by the House public-lands committee.

A considerable part of the additional $25,000,000 would be earmarked for work on gas synthesis and gasification of coal. The Morgantown laboratory would have $1,000,000 for basic work on gas synthesis of coal which would be demonstrated at the Louisiana, Mo., plant. The Louisiana demonstration plant would be given $885,000 for construction and $4,675,000 for operation during the last 3 years of the program, and $850,000 would be earmarked for underground gasification work at Gorgas, Ala.

New Field for Isotopes

WASHINGTON.—Use of radio-isotopes in solving production and refining problems will be studied this fall by the Bureau of Mines at a new $35,000 radiochemical laboratory now building at the Bartlesville experiment station.

Since isotopes were made available by the Atomic Energy Commission they have been used as tracers in many fields of research, but bureau scientists have been unable to use them because of the lack of proper space and equipment.

The new laboratory is designed for use of isotopes as tracers in various investigations in the secondary recovery of petroleum by water flooding and injection of gas and air. Their first use will be in waters for subsurface injection water-flooding.

Specially designed for the use of radioactive material, the laboratory, which is expected to be completed in September, will permit the bureau to study the application of isotopes in many ways as "tracers" to develop data not obtainable with methods and equipment now in use.

Rubber-Plant Reactivation

WASHINGTON. — The Reconstruction Finance Corp. announced last week the companies which will produce an additional 88,000 tons a year of synthetic rubber *(The Oil and Gas Journal, July 13, page 52)*.

The United States Rubber Co. will reactivate and operate the GR-S copolymer plant at Port Neches, Tex., now in standby, transferring its operations from the government plant it now runs at Borger, Tex. Arrangements have been made with the Phillips Chemical Co. by the RFC to take over and continue operation of the Borger plant.

The butadiene plant at Houston which is to be reopened will be operated by Sinclair Rubber, Inc., and the additional butyl facility at Baton Rouge will be operated by Esso Standard Oil Co., present operator.

The three plants are to produce an additional 75,000 tons of general-purpose rubber and 13,000 tons of butyl rubber annually.

PURE RESEARCH.—Newly completed administration and chemical building, first of a campus-like group of laboratory buildings being built by Pure Oil Co. on a 140-acre site near Crystal Lake, Ill., residential suburb of Chicago. The location was picked deliberately to provide pleasant surroundings remote from industrial activity. The new center eventually will house all of Pure's research and development work, and units will be moved to it from the company's old North Shore laboratories as rapidly as facilities are made available. The project is under the direction of C. M. Ridgeway, A. B. Anderson, and C. Porter Langlitt, vice president in charge of refining.

XUM

Economical Pipe Line

Mid-Valley takes advantage of opportunities for savings in investment and operation in building big-inch carrier

C. O. Willson

THE 1,000-mile crude-oil pipe-line system of Mid-Valley Pipeline Co., now nearing completion, was designed to assure maximum economy in operation with the lowest capital investments consistent with long-range planning.

In carrying out this program, several construction features will have a bearing on total expenditures and operating efficiency. Among these features are:

1. Largest application of 20 and 22-in. pipe with a yield strength of over 50,000 psi. ever made, resulting in a saving of several million dollars in pipe costs.

2. Use of shortest route possible from western Mississippi through western Tennessee and central Kentucky to Ohio boundary. This route, through a rugged area, is reflected in construction problems, but there are savings over the usual and longer route north from Texas and east across Illinois and Indiana.

3. The test of economy in expenditures and operation was applied to each station site. The power includes purchased electricity, diesel oil, and dual-fuel installations adaptable to both natural gas and diesel fuel. The stations conform to latest developments in design for big-inch crude-oil systems, including automatic controls, but emphasis in buildings and other facilities is placed on utility rather than elaborate appearance.

4. The all-important communications in the operation of the line will be handled by the largest application ever made of the microwave radio-relay system. While the initial investment of approximately $750,000 is sizable, it is less than the cost of a pole and wire system for similar service, and the savings in operating costs and contributions to operating efficiency mean this innovation can also be listed as an economical facility.

Aside from these and other construction and operating features, the Mid-Valley, a common carrier and the largest crude-oil domestic installation in 1950, is significant for the changes it will bring in over-all transportation operations in the area which it serves.

Area served. — The line, parts of which are now in operation, when finally completed will have an initial capacity of 157,000 bbl. daily. This will ultimately be increased to 235,000 bbl. daily. While it is expected that considerable oil will be hauled for others, the line, which is jointly owned by Standard Oil Co. (Ohio) and Sun Oil Co., is being built primarily to bring crude from Texas, Louisiana, and Mississippi to the refineries of the owning companies in Ohio and Kentucky.

The Standard of Ohio refineries and their rated daily crude-oil capacities, according to the 1950 refining survey of The Oil and Gas Journal, are: Latonia, Ky., 16,000 bbl.; Cleveland, 42,500 bbl.; Toledo, 21,000 bbl.; Lima, 30,500 bbl.; total 110,000 bbl. The Sun Oil Co.'s Toledo refinery has an ultimate crude-oil capacity of 60,000 bbl. daily.

These Standard of Ohio and Sun refineries are all modern in design and have a cracking capacity of 169,500 bbl. daily. They are tied in to product pipe-line systems which connect to most of the major distributing centers in Ohio, either directly through lines owned by the two companies or through systems owned and operated by other companies.

In addition to supplying the bulk of the crude-oil requirements of the Standard and Sun refineries, the Mid-Valley system will operate as a common carrier and through connections with other pipe lines or by waterway will be in position to compete in crude-oil transportation throughout the Middle West and East. It will be the largest artery serving Ohio, where there is a total of 15 refineries with crude-oil capacity of approximately 285,000 bbl. daily.

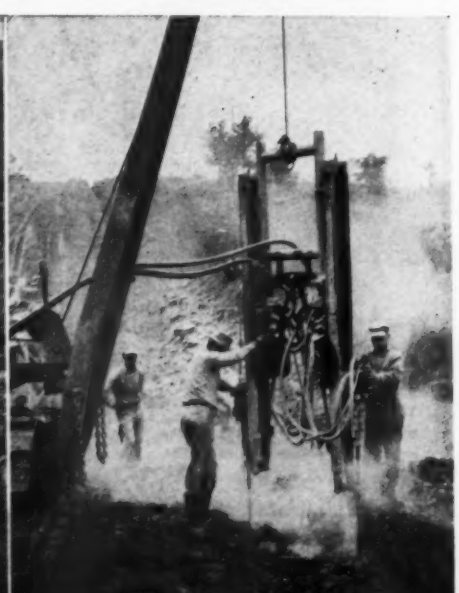
The completion of the line will bring the disposal of what was one of the largest facilities for the transportation of crude oil by inland waterways. These consist of a variety of towboat and barge units, enlarged over a period of years by Standard of Ohio in transporting crude oil by way of the Mississippi and Ohio rivers.

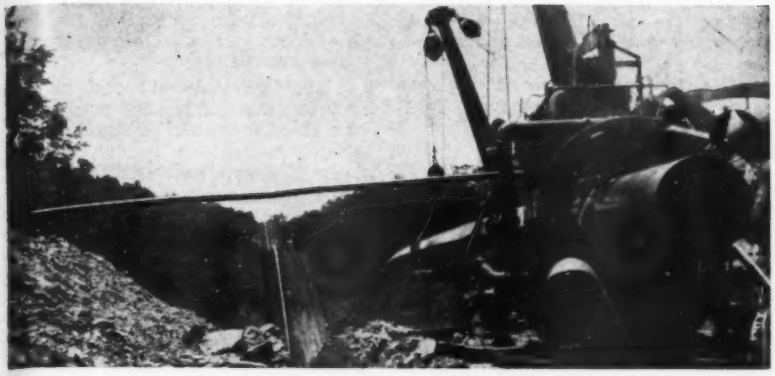
The system of Sohio Pipe Line Co., a 100 per cent subsidiary of Standard Oil Co. (Ohio), extending from Illinois and a point on the Ohio River in Indiana, will continue to operate. Standard of Ohio is also a minor stockholder in the Ajax Pipe Line system, extending from Oklahoma to a point near St. Louis.

For the first time, Sun Oil will now have an interest in a crude-oil system serving its Toledo refinery. The capacity of this plant has been greatly increased since the close of the war and further expansion is in prospect. The Sun company through a 100 per cent subsidiary—Susquehanna Pipe Line Co., has a products line extending from the Marcus Hook, Pa., refinery to eastern Ohio where it connects to the product pipe-line system owned by Standard Oil Co. (Ohio).

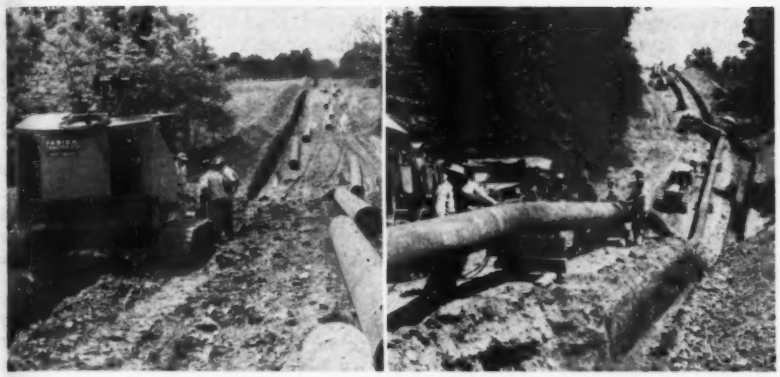
In partial operation.—The Mid-Valley system is now in partial operation. Crude oil is delivered to the line

On this and the opposite page are some of the pictures taken by the author during a visit by air and car, reflecting part of the full-scale construction activity now under way on the Mid-Valley line. Photos below show boring under state highway in the vicinity of the Kentucky River, and rock drill being operated from sideboom tractor.

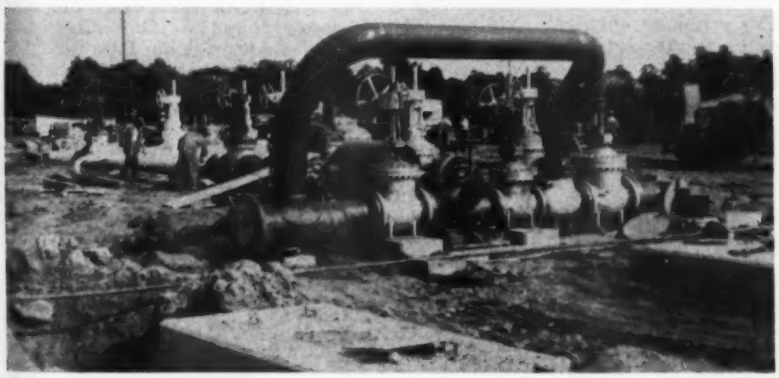




Coating and wrapping 22-in. pipe.



Cleaning out ditch near Clarksville, Tenn., and welding 22-in. pipe near Waverly, Tenn.



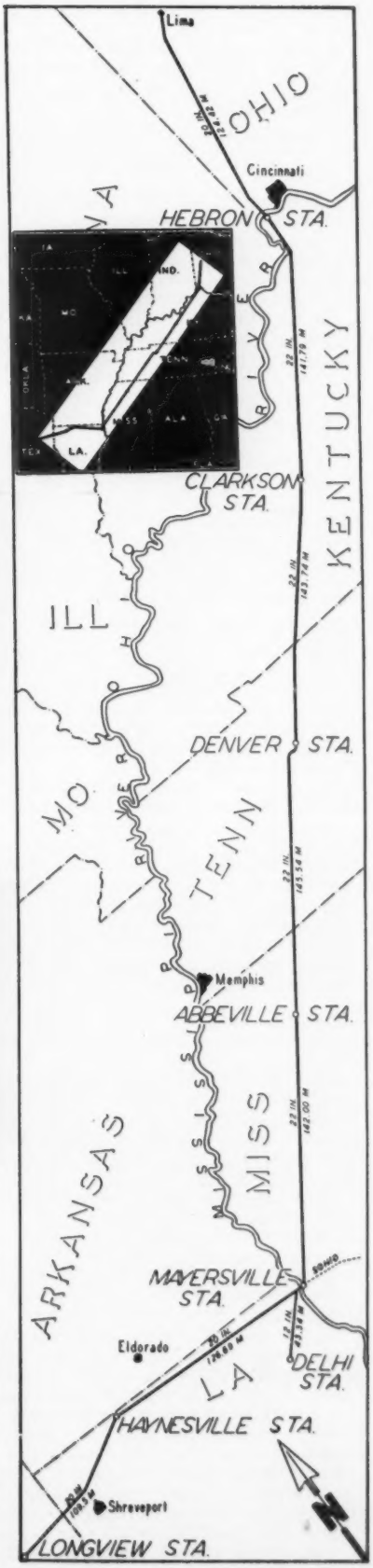
Installing booster pump, manifold, heat exchangers, and other equipment at the Clarkson station.

from an Ohio River terminal west of Cincinnati and shipments are being made to Lima. The operation will continue until the rest of the line is completed when the Ohio section will become part of the system.

The 120-mile section from Haynesville, La., to Mayersville, Miss., is in operation and deliveries are being made to eight new 81,000-bbl. tanks which will be part of the Mid-Valley's storage when the complete line is in operation. Deliveries are being made at Mayersville to river barges up the Mississippi to Ohio River points at Mount Vernon, Ill., and Bromley, Ky. The section from Delhi field in Louisiana is in operation. Locations and sizes of these lines are shown on the accompanying map.

High tensile pipe.—The pipe consists of A. O. Smith Corp.'s 52,000-psi. and National Tube Co.'s A.P.I. 5LX50 seamless pipe with the same working pressure as the A. O. Smith pipe. The use of this pipe will result in a substantial saving in tonnage requirements.

In using this pipe a telescoping program was utilized, determined by the hydraulic gradient adapted to a scale coordinated with the profile. It gives the required safety factor for working conditions including the



Route of Mid-Valley pipe line.

ultimate capacity of 235,000 bbl. daily.

A typical section, under the telescoping plan, has the following wall thicknesses:

11/32-in.	wall,	79.51	lb.	per foot.
5/16-in.	wall,	72.38	lb.	per foot.
9/32-in.	wall,	65.24	lb.	per foot.

Telescoping extends roughly 12 to 15 miles from the stations.

In the use of this pipe it has been found necessary to change conventional welding practices. Preheating is carried out under certain temperature conditions. In the case of the thinnest pipe, the preheating is used only at temperatures below 40° F.

The first weld is a stringer bead and the second bead is run within 2 to 3 minutes before the temperature drops below 200° F.

Laying practices reflect the hilly terrain and rocky conditions of the soil at many points. It is said that the line has had the most extensive use of rock shield, consisting of asphalt-impregnated fiber board. It is used in rock ditches where there are slopes as great as 40°.

Shortest route.—The basis for the general route of the lines was a map study of the region served by the system. The controls on the map, which was mounted on a table, were the points where crude oil is supplied to the system and also the delivery points.

Pulleys were mounted on the table at the control points. Strings which ran over the pulleys were attached to each other. It was possible to weight these strings at the freed ends in relation to the investment costs per mile for each section. This method gave the general route of the line with the exact route determined by aerial surveys and through contour and profile studies.

Stations.—The studies previously mentioned determined that rates at Mayersville, Miss., Denver, Tenn., and Abbeville, Miss., stations were favorable for the use of purchased electric power with dual fuel at Longview, Tex., and Haynesville, La. At Hebron, Ky., and Clarkson, Ky., diesel power will be used.

The Longview and Haynesville stations each have two 800-hp. dual-fuel engines connected to single-stage centrifugal pumps. The Clarkson station will have two 1,700-hp. supercharged diesel engines of the Cooper-Bessemer L.S. 8 type.

In the case of the electric stations the motors on the main line will be 1,500 hp. Each station will have two units. Provision is made to ventilate the motor room and to provide protection from gases for the control room through the maintenance of constant pressure. The control centers in a raised platform with the control room facing through a window to the pump and motor room.

The controls limit discharge and intake pressures automatically through decreases or increases in engine speeds. The line will automatically stabilize itself to the slowest station on the line.

The line will transport several grades of crude oil of varying gravities, according to present plans. In order to compensate for the varying pressures required to assure uniform deliveries, provision is made for supplementary pumping capacity at each station. The pressure can be increased through the use of a booster pump at each station connected to storage facilities. In the case of the electrical stations, a throttle arrangement decreases the flow of oil when necessary in order to achieve stability in the movement of the oil for the entire system.

The station buildings will be of concrete-block construction to the window level. The remainder of the buildings are of corrugated asbestos. The operation of the line will require about 1,000,000 bbl. of working stock plus line fill of about 2,000,000 bbl. of crude oil.

Microwave system.—The use of the microwave system will give the Mid-Valley line a communications service not duplicated by any other type. The system operates with superhigh frequencies which travel a straight line. Since the curvature of the earth limits the distance between radio points, approximately 35 towers, 80 to 250 ft. in height, will be installed at distances of 14 to 40 miles apart.

The following description, supplied by company engineers, explains several features of the microwave communication:

"The tower is a two-way repeater station. The flat reflectors at the top pick up the aimed microwaves and deflect them to the transmitting and receiving unit at the base of the tower. In sending messages, the opposite takes place, the T-R unit at the base projecting the wave beam up to the reflector. At the pump stations the microwaves coming in are reduced by converters to the lower frequencies used by regular voice and teletype frequencies.

"It will be possible to have seven or more messages going through the same tower at the same time. In other words, the dispatching office will be able to send a teletype to all stations at the same time that Denver station is sending a voice message to Clarkson and Hebron is talking to Mayersville. This is possible because microwave radio bands are narrow—in fact some systems are able to handle as high as 23 speech channels. Mid-Valley's system will have eight channels, but more can be added at any time.

"At the station the messages leave on a different wave length from the one they arrive on. This is to prevent interference by having a portion of the transmitted beam get back into the tower receivers.

"Mid-Valley's system will be five times as long as any present installation. Now the longest is the Bell's New York-to-Boston television microwave system.

"Microwave doesn't cost much to operate. Less than one watt—about the amount needed to light a pocket flashbulb light—is enough power to span the gap between the stations on the microwave system. Another advantage is that the relay won't pick up static from lightning or any man-made interference such as is caused by automobile ignition systems, etc. If one unit goes out, another automatically takes its place; and, at the same time, an alarm instantly gives notice of the difficulty."

Officers.—Officers of the pipe-line subsidiaries of the Standard and Sun companies are in charge of the Mid-Valley operations. Some are on leave from their companies to which they will return when the Mid-Valley is completed and in full operation. The following are officers of the Mid-Valley company: W. C. Kinsolving (president, Sun Pipe Line Co.) president; S. H. Elliott (vice president-director in charge of transportation, Standard Oil Co. of Ohio), executive vice president; E. F. Morrill (president, Sohio Pipe Line Co.), vice president; B. K. Morse (vice president and general manager, Sun Pipe Line Co.), vice president; A. E. Wolf (vice president and secretary, Standard Oil Co., Ohio), treasurer; J. B. Moffett (chief counsel, Sun Oil Co.), secretary; and J. R. Shipley, Jr. (chief engineer, Sohio Pipe Line Co.), chief engineer.

Contractors.—The following contractors are in charge of the construction work now under way or completed on the Mid-Valley system:

Section 1, Longview to Red River, Burden Construction Co.; Red River to Haynesville, Latex Construction Co.

Section 2, Haynesville to Mayersville, Latex Construction Co.

Section 3S, Mayersville to Oakland, Miss., Associated Pipe Line Contractors.

Section 3N and 4S, Oakland, Miss., to Hornsby, Tenn., Houston Construction Co.

Section 4N and 5S, Hornsby, Tenn., to Russellville, Ky., Eastern Construction Co.

Section 5N and 6S, Russellville, Ky., to the Salt River, Britton Construction Co.

Section 6N, Salt River to Hebron, Ky., H. L. Gentry Construction Co.

Section 7, Hebron, Ky., to Lima, Ohio, Mahoney Construction Co.

Section 8, Stephens and Smart, Ark., to Haynesville, La., Latex Construction Co.

Section 9, Delhi, La., to the Mississippi River, Latex Construction Co.

Motorola Co. has the contract for the design and installation of the microwave system.

Return to MER

Texans listen to war talk, set stage for August production boost by dropping "yardstick" method of fixing allowable

AUSTIN.—The Texas Railroad Commission last week returned to the abandoned Most Efficient Rate of production basis for setting the state's allowables.

In doing this and retaining the current 21-day producing pattern for most fields, the commission advanced August quotas 107,523 bbl. daily over the July figure.

The commission made exceptions in the new West Texas reef fields and left East Texas field on a 19-day schedule, averaging 277,520 bbl. daily. A second postponement was announced in the proposed change in gas-oil ratio schedules.

The present war situation had considerable influence at the meeting. Most company spokesmen believed the nation's stocks should be increased as a safety measure and were in favor of a return to the MER producing basis.

The commission indicated Texas was the only producing state which can substantially increase its allowable and would like to see the state's oil industry ready for any emergency.

Company positions.—Humble Oil & Refining Co. led in testimony for additional crude, and a return to the MER. Humble spokesmen testified they needed at least 11,000 bbl. daily of more low-cold-test crude (from Gulf Coast fields) to furnish products needed on Navy and other contracts.

Companies against returning to the MER standard included Stanolind Oil & Gas Co., Sinclair Oil & Gas Co., Magnolia Petroleum Co., and producers in the Ranger-Abilene area of West Central Texas, who a few months ago were being crowded out of their crude markets and pipe-line space by the increased flow from new reef fields.

Stanolind reported it is getting 27,000 bbl. more of West Texas sour crude than it can sell, and Ralph J. Dietler, Stanolind vice president from Tulsa, pointed out that increased demands for war have not yet materialized.

Raymond Meyers, speaking for Magnolia, said a return to full MER would give Scurry County more production than could be moved to market over existing lines.

Pan American Pipeline Co. informed the commission that its new 34,000-bbl.-daily capacity carrier from Scurry County was nearing completion, and Humble said it expected to finish a new line into Runnels County within 60 days.

Effect on fields.—Scurry County fields retaining the "yardstick" formula, and with 25 producing days in August, included Diamond M. Kelly-Snyder, Sharon Ridge Canyon, Cogdell, and North Vincent (Reinecke). Commission Chief Engineer Jack Baumel said this was necessary to keep production within pipe-line capacity.

Districts 8 and 3 received the greatest increases for August. These districts took the greatest cuts last March when the commission abandoned the MER allocations. August production for West Texas District 8 will be 850,070 bbl., an increase of 56,033 bbl. daily. Gulf Coast District 3 will be up 39,398 bbl. daily to 449,493 bbl.

The average calendar-day allowable of 2,580,328 bbl. for August compared with purchaser nominations of 2,518,855 bbl., and the Bureau of Mines' forecast of demand of 2,240,000 bbl. daily.

In announcing a second delay in the proposed reduction of gas-oil ratios, Murray said the commission had tentatively agreed upon reducing the present ratio of 2,000 cu. ft. per barrel to 1,000 cu. ft. for new fields, and that no change was to have been made in fields already having ratios in excess of 1,000 cu. ft. The matter is to be studied during a series of hearings on fields over a period of several months.

The next statewide hearing will be in Austin August 17.

Price Increase

Union ups heavy crude and residual 20 cents

LOS ANGELES.—An increase of 20 cents per barrel in the price of 14°-gravity crude oil was posted by Union Oil Co. of California in all fields where it purchases, effective 7 a.m. July 18.

The increase scales down to no increase for 26°-gravity and above. At the same time Union advanced the price of heavy bunker fuel oil from $1.40 to $1.60 per barrel. Early Tuesday other companies were considering the new posting but none had announced it would meet the increase.

This advance follows a similar increase of 15 cents on June 29 posted by Standard Oil Co. of California and since met by all major purchasers. The over-all effect is to restore heavy-crude prices to their level of a year ago, in general, but still 30 cents below the level of January 1949.

In commenting on the new raise, Union's president, Reese H. Taylor, stated:

"Despite this increase in the price of fuel oil, our prices for this product still remain elsewhere. Historically fuel-oil prices in the West have been substantially the same or higher than in other areas. This increase is an effort to bring our prices somewhat closer to the market value of the product."

***MILEAGE MERCHANT.**—Major gasoline marketers are currently engaged in a fight for gallonage, and as part of its campaign Shell Oil Co. employs a "Women's Travel Director," Carol Lane, who travels more than 50,000 miles a year addressing women's clubs to boost automobile travel in general and the Shell Touring Service in particular. She is shown here visiting Shell's refinery at Norco, La., with Paul Hurley, refinery manager, and Hugh Mulvaney, of the company's public-relations staff.*

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Push-Button Line

Shell inaugurates automatic product-transmission system

NEW YORK.—At 2 p.m. July 17 D. B. Hodges, vice president of Shell Oil Co. in charge of transportation and supplies, spun the telephone dial on a teletype machine in New York.

By this simple process Shell put into operation its radically new remote-control method of operating its Wood River, Ill., to Lima, Ohio, products pipe line.

Under the new system, the operation of four pumping stations is completely automatic and handled by employes in the R.C.A. building here.

Electrically controlled pumps start and stop, and electrically motivated valves open and shut upon receipt of teletype signals.

Most unusual feature of the installation is a set of meters which report to New York via teletype the suction and discharge pressures and electrical load of each station any time the teletype dial in New York asks for the information.

The central dispatching office in New York schedules all product movements and takeoffs.

At the four modernized pumping stations, located in New Douglas, Effingham, and Dennison, Ill., and North Salem, Ind., only one attendant is required. He performs routine upkeep and maintenance and can operate controls by hand if necessary.

A 17-ft. control board in Shell's New York office traces the progress of products in the 450-mile pipe line in the Midwest. Shell dispatchers set markers and adjust the charts to show exactly where each product is, 24 hours a day. Products move through the line at about 4 miles an hour. As many as 22 separate products can be handled in the line at the same time.

New Pipe-Line Practice

Service eliminates minimum tender, cuts deduction for shipping losses, offers to segregate different crudes

Henry D. Ralph

CHANGES in pipe-line rules and operating practices of considerable significance to both producers and refiners have been announced by Service Pipe Line Co. to go into effect August 15.

Principal departures from former practices are:

1. Elimination of minimum tender.
2. Segregation of crudes of different characteristics.
3. Reduction in the arbitrary deduction for loss in shipping natural-gas liquids with crude.

These changes, plus other minor ones, are included in new tariffs just filed with the Interstate Commerce Commission covering the entire crude-oil system formerly known as Stanolind Pipe Line Co. The new rules also will apply to joint movements through connecting lines where the other operators agree.

"The new rules clarify the old rules and in many instances effect changes which will afford added advantages and services to shippers using the company's common-carrier facilities," explained J. L. Burke, president of Service Pipe Line Co.

"Another reason for this revision is to clarify and simplify our tariffs. Tariff simplification is a problem receiving attention of all types of carriers. The last general revision of our rules occurred in 1935. Since then, particularly since the late war, major revisions have been made in our facilities and operations. This modernization of our tariffs matches the modernization of our system."

No minimum tender.—The most dramatic feature of the new tariff is elimination of the minimum tender, which formerly was 1,000 bbl. The only requirement remaining is that the line is not required to deliver a batch of less than 5,000 bbl. at any one point, it being explained that this is the smallest quantity it is normally practical to deliver.

For many years the minimum tender has been a bone of contention and a political football. It has been contended that the minimum tender is a monopolistic device to discourage independents and confine use of a pipe line to big operators.

Actually, it is pointed out by pipeline men, the minimum requirement has not been a real hardship on small producers because in almost every field there are purchasing companies who perform a wholesaler's function of gathering crude from individual wells and assembling and storing it for shipment in tender lots.

The new Service tariff defines a tender as an offer of any quantity of crude to move between specific points so long as the total tendered will be available for transportation within not more than two consecutive calendar months. This is to assure that all tenders will be completed and accounted for in a reasonable length of time.

Batching crude.—Of particular importance to refiners is the new arrangement of segregating crudes and handling them in batches much as in a products line.

Originally all crude was handled by pipe lines as a common stream, without regard to its origin or specifications. However, modern refining practice demands delivery of crudes of given characteristics. The new Service tariff provides for this, and the company is making changes in its operating and dispatching practices in order to keep various crudes segregated.

This practice is particularly important on the Service line since it handles crudes of various types from Wyoming, West Texas, and the Mid-Continent. Each section of the system may be moving several batches of common streams of different specification crudes at one time, the amount varying with the diameter and location of the section.

Gas liquids.—For some years many crude lines have shipped casing-head gasoline, field condensate, natural gasoline, and liquefied petroleum gas mixed with crude. These volatile products, when mixed with heavy crude, increase the total capacity of the line and also provide refiners with a higher grade of crude. The practice has become increasingly important with the construction of many new gasoline plants which do not have other outlets for marketing all of their products.

The new Service tariff provides for taking any such natural-gas liquids up to a vapor pressure of 75 psi. provided the vapor pressure of the resulting mixture does not exceed 13 psi.

Formerly these so-called "indirect" products were subject to a deduction of 8 per cent for evaporation and loss in transit. Improvements in operating techniques have reduced these losses, and the new Service tariff provides for a deduction of only 5 per cent. On crude shipments the Service company deducts ½ per cent for losses in handling.

Storage.—The new tariff also clarifies the rules covering storage of crude and demurrage charges. Since the new batching method will require greater use of the company's tankage at pumping stations, the tariff makes it clear that the company is not engaged in the storage business and will not undertake to hold crude which is not delivered immediately.

However, the new tariff provides for storage in transit, under which the company will place crude in storage tanks of a shipper along the route and will resume the movement at a later date at the same rate as for a continuous movement.

El Paso Line Approved

Construction to begin immediately on 451-mile, big-inch carrier to move gas from San Juan basin to California

WASHINGTON.—El Paso Natural Gas Co. has won its 2-year fight for authority to construct a natural-gas pipe line from the San Juan basin of New Mexico to the Colorado River to connect with the existing line of Pacific Gas & Electric Co. running to the San Francisco Bay area.

The Federal Power Commission approved the project July 14, just meeting El Paso's deadline for taking up options on some of the reserves needed to feed the line.

Exactly a year ago FPC tentatively rejected the application on the grounds that there were not sufficient gas reserves in the area to support the project. Later the proceedings were reopened for further evidence, and in the meantime more gas discoveries have been proved in the San Juan basin.

What it means.—Construction of the line will start almost immediately, as FPC stipulated that it must be in service by January 1, 1952. The line will mean:

1. More gas for the San Francisco area.

2. More rapid development of the "Four Corners" region of New Mexico, Arizona, Colorado, and Utah now that an outlet for gas is assured.

3. Better utilization of oil-well gas from the Permian basin of West Texas and Southeast New Mexico because fluctuations in the supply of this gas to the El Paso system can be offset by dry gas from the new line.

The new El Paso line will be 451 miles long, terminating on the California border near Topock, Ariz., where it will connect with the P. G. & E. line. The P. G. & E. line is now fed at Topock by El Paso through a spur from El Paso's main line between West Texas and southern California.

The line from the San Juan basin to Topock will be 24 in. in diameter, will have two compressor stations with a total of 7,640 hp., and will have an initial capacity of 150,000,000 cu. ft. of gas per day. In addition the project calls for approximately 100 miles of feeder line, a gas-dehydration plant, and in addition El Paso will deliver 15,000,000 cu. ft. of gas daily through six branch lines.

Also, El Paso will construct six branch lines totaling 175 miles to deliver 15,000,000 cu. ft. of gas daily to Southern Union Gas Co. for resale in Flagstaff, Williams, Prescott, Winslow, Seligman, and Kingman, Ariz. Total cost to El Paso is estimated at $44,500,000.

In connection with the project, Delhi Oil Corp., which will supply much of the gas for the new line, will construct a natural-gasoline plant between Farmington and Shiprock to process gas from Barker Creek and other fields feeding the line.

To handle the new gas, Pacific Gas & Electric Co. has been authorized by FPC to install 32,160 additional horsepower in compressor stations along its line between Topock, Ariz., and Milpitas, Calif. This is estimated to cost $7,800,000.

Background.—The new project has had a stormy history. The original application was filed in the summer of 1948 by San Juan Pipe Line Co., organized as an affiliate of the El Paso company. At about the same time the El Paso-P. G. & E. system was proposed.

In February 1949, FPC authorized P. G. & E. to construct 506 miles of 34-in. line between Milpitas, in the San Francisco Bay area, and Topock, and authorized El Paso to build 130 miles of 26 and 30-in. line to Topock from its Gila compressor station in central Arizona. El Paso was also authorized to loop its main line and build additional feeder lines in Texas to supply P. G. & E. with 250,000,000 cu. ft. of gas daily. This joint project is now under construction.

A month later, El Paso substituted itself for the San Juan company as applicant for the San Juan basin line, and still later amended the project to include service to the six Arizona towns. Hearings were held last summer, at which El Paso argued that San Juan gas would be needed to offset a forecast shortage of natural gas in the San Francisco region by 1951. It also contended that a supply of dry gas, such as that from the San Juan region, was needed to firm up and stabilize deliveries to California because of the daily and seasonal fluctuations in the supply of oil-well gas from the Permian basin.

The FPC, however, questioned the sufficiency of gas reserves in the San Juan basin, since it has a standing policy not to authorize a line without sufficient reserves committed to it to operate at least for its amortization period. At that time there were relatively few gas wells in the area. Producers argued that development of proven reserves would be impossible until there was a market for the gas. The matter appeared stalemated, and on July 14, 1949, FPC announced that El Paso had failed to show that it has sufficient gas commitments to justify the proposed line. However, it held the docket open, and at El Paso's request hearings were resumed last January.

At these hearings another complication arose. Interstate Gas Co. of Nevada intervened to demand that the El Paso line be declared a common carrier and be required to transport gas for it. El Paso resisted this on the ground that to transport gas for others would interfere with its ability to meet its contractual obligations.

The additional evidence of gas reserves in the San Juan basin apparently satisfied the commission. In granting the construction authorization it rejected the Nevada concern's application that the line be a common carrier. It also stipulated that some of the additional gas be made available for the requirements of California-Pacific Utilities Co., Southwest Gas Corp., and the Muroc, Calif., air base. It approved an agreement between El Paso and the Atomic Energy Commission reserving to AEC in marketable quantities for a period of 25 years a total of not exceeding 90 billion cubic feet of gas in Barker Dome field.

Code 25 Group Reactivated

The American Petroleum Institute has reactivated its committee on Code 25 which sets standards for measuring, sampling, and testing crude oil and governs quantitatively and qualitatively the purchase and sale of most of the crude produced in the United States.

The new committee is composed of 66 members from all branches of the industry, including the chairmen of four A.P.I. and A.S.T.M. committees dealing with allied subjects. The committee is nondivisional in character

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and will report directly to the president through E. O. Mattocks of the A.P.I. staff.

Chairman of the new committee is H. H. Anderson, vice president of Shell Pipe Line Corp. Vice chairman is George H. Supple of General Petroleum Corp. A working subcommittee is headed by R. Charles Nicholson of Shell Pipe Line Corp.

Employe Plans

Socony-Vacuum liberalizes retirement, other benefits

A NEW employe retirement plan providing a top minimum of $200, including the proposed liberalized Social Security benefits, after 40 years of credited service has been inaugurated by Socony-Vacuum Oil Co., Inc.

The new retirement plan is one of a number of improvements in its employe-benefit program which were announced last week by the company. In a letter accompanying the announcement, B. B. Jennings, Socony-Vacuum president, said the changes are effective for all unorganized employes and are being offered also to representatives of employes in collective-bargaining units.

The monthly retirement income set a minimum of $125, inclusive of liberalized Social Security, for employes with 25 years of credited service. The plan provides for a $5 monthly increase for each additional year up to the top minimum of $200.

As a result of the general improvement in the employe-benefit program, several new plans are being established, others are being improved, and the balance are being continued without change. Present employe contributions remain the same. The changes are generally effective September 1, the company said.

Other new plans include one for total and permanent disability benefits which assures a lifetime income for any employe with more than 20 years credited service, in any case of total and permanent disability and a plan for termination allowances which sets up a schedule of benefits to assist any employe who loses his job through no fault of his own.

Under revisions in existing plans, an employe with 20 years of service may retire if he wishes with an actuarially-adjusted annuity within 5 years preceding the normal retirement date. A new employe now can participate in the annuity and insurance plan immediately following employment.

The changes made by Socony-Vacuum reflect the trend toward higher benefits and other improvements in employe plans which are currently being made by various oil companies and industry in general. Many of these have been based on the anticipated passage of legislation now in Congress increasing Social Security retirement payments. The retirement income minimum is inclusive of the greater amount provided through the federal Government.

Husky Gets New Name

CODY, Wyo.—Husky Refining Co. has been merged with the newly formed Husky Oil Co.

Glenn E. Nielson, president, said the reorganization was made to give the company a name indicating its operations as a fully integrated oil company. Stock ownership and company officials are unchanged. Two new directors were added.

Husky's Canadian subsidiary, Husky Oil & Refining, Ltd., is not affected by the merger.

Compact to Meet

FRENCH LICK, Ind.—Preliminary preparations are being made here for the summer meeting of the Interstate Oil Compact Commission, to be held in French Lick Springs Hotel August 3-5.

Opening day will be devoted to meetings of the compact's standing committees, with addresses, committee reports, business session, and an open forum scheduled for the second day.

Final day of the meeting will feature an address by Paul D. Torrey, chairman of the compact's secondary recovery advisory committee, a roundtable discussion on problems relating to conservation in the member states, and an open forum.

Gov. Henry F. Schricker, of Indiana, will deliver the welcoming address at the opening general session August 4.

U.O.P. Forms Subsidiary

CHICAGO.—Universal Oil Products Co. announced this week it has organized Procon, Inc., as a subsidiary to handle construction of refinery specialty installations and particularly units for operating Universal's new Platforming process. J. C. Raaen is president of the new company, C. B. Whyte, vice president and general manager, and C. J. Giuliani, secretary and treasurer.

CANADA

Largest Lake Tankers

The two largest freshwater tankers in the world are scheduled to be launched in October in the Great Lakes.

The vessels are the Imperial Redwater and the Imperial Leduc. They form an integral part of the over-all plan of Imperial, Ltd., for the transportation of Alberta crude to Ontario refineries.

The hulls of the two tankers are 620 by 68 ft. and weigh 5,000 tons. They are named after Alberta's two leading fields discovered since the war. Pipe Line Tankers, Ltd., a newly formed company, is building the ships for charter by Imperial. The Imperial Leduc is being built at Collingwood, and the Leduc at Port Arthur, Ont.

The tankers will be fitted out this winter in order to begin next spring moving crude from the Superior, Wis., terminal of the 1,180-mile pipe line from Edmonton, Alta. Pipe line crews are now rushing completion of the line, laying an average of 9 miles a day so that all pipe will be in the ground before winter. Filling of the lakehead tankage is to begin late this year.

New Dock at Sarnia

SARNIA, Ont.—Construction of a dock 610 ft. long at an estimated cost of $500,000 is being undertaken by Imperial Oil, Ltd., as the final step in bringing Alberta crude to its Sarnia refinery. It will be built on land made available for leases to Imperial by Chesapeake & Ohio Railway and will be completed by the spring of 1951. Special provision will be made for fire protection, and dredging will provide 26 ft. of water for the new Imperial tankers which have a loaded draft of 24 ft.

Crude from the Alberta fields will be carried from Edmonton to Superior, Wis., by a pipe line now being constructed by Inter-Provincial Pipe Line Co. Thence the oil will be transported by two new tankers, the largest ever built in Canadian shipyards, to Sarnia. (See accompanying story).

NEXT WEEK

MIDYEAR REPORT—in two sections:

1. **Economics and statistical.**—The Journal's semiannual forecast of wells to be drilled the next 6 months and report on completions the first half of the year; number of rotary rigs operating and where; report and forecast of crude production here and abroad; forecast of demand for petroleum products; special discussions on natural-gas expansion, imports and exports, the situation in light hydrocarbons, and refining runs and capacities; and tabulations of pipe-line, refinery, and natural-gasoline construction projects under way and planned.

2. **Engineering reference.**—Authoritative reference articles on refining and petrochemistry, drilling, production, pipe lines, and natural gas.

Few Battle Scars

Forty-three new Louisiana laws cover oil, but industry escapes legislative session without serious restrictions

Leigh S. McCaslin, Jr.

BATON ROUGE.—The oil industry has survived the 1950 session of the Louisiana Legislature without being the target of any crippling legislation, although some observers say that more detrimental bills were introduced than in any past session.

During the session 154 bills affecting the industry were introduced, but only 43 passed the two houses and were signed into law by Gov. Earl Long. Altogether, a record of 1,462 bills were introduced in the house and senate during the 60-day session.

No important tax legislation of concern to the oil industry was enacted. However, several bills were introduced such as corporation franchise and income tax which would have added to the tax burden of the industry. Biggest fight was over Senate Bill 63, the so-called antitrust law, which would have prohibited agreements, monopolies and conspiracies in restraint of trade. It was killed on the house floor.

One of the more important bills enacted was the standard gas measurement law. It provides that natural gas must be measured at a standard pressure base of 15.025 psia. and a temperature base of 60° F. There was quite a fight between proponents of a 14.65 pressure base and those urging 15.025 base. Texas, Oklahoma, and Arkansas all use the 14.65 figure. Those opposed to this base in Louisiana said that it would result in an increase of from $250,000 to $300,000 a year in the severance taxes paid on gas by producers.

Another new law of considerable interest is Act 46 which authorizes the State Mineral Board to extend offshore leases for 2 years at present rental rates.

The Louisiana-Arkansas division of the Mid-Continent Oil & Gas Association has listed the following new laws as of interest to the industry:

Senate Bills

S-38. Require financial reports from oil operators and producers to all owners of property within drilling unit. Act 387.

S-51. Eliminate advertising of oil lands offered for lease in New Orleans newspaper. Act 388.

S-52. Provides for direct payment of bonus money from oil leases to state agencies by state mineral board and returns authority in connection with lease to agency. Act 290.

S-53. Specifies that holder of oil lease from the state may use facilities he is authorized to construct on land covered by his lease for storage and processing of oil, gas, and minerals produced. Act 74.

S-54. Removes $3,600 limitation on salary of secretary of state mineral board. Act 291.

S-55. Repeals law requiring state agency leasing oil land through state mineral board to be present at session when lease is executed. Act 292.

S-148. Provides for prescription of mineral rights owned by minors. Act 510.

S-158. Authorizes State Mineral Board to extend off-shore leases for 2 years at same rental. Act 46.

S-185. Amends workman's compensation law to make mandatory furnishing by employer to employee of all medical records pertaining to the latter. Act 539.

S-202. Exempt women employed in executive capacities from wage and hour law. Act 466.

S-256. Permit partition of real estate without making mineral holders a party to it. Act 521.

S-299. Limits to prevailing market price sum charged land owners for drilling costs. Act 526.

S-309. Provide for ex parte hearings involving mineral leases on property of minors and interdicts. Act 529.

S-391. Standard Gas measurement law. Act 479.

House Bills

H-13. Repeal provisions of revised statutes relative to materialmen's and mechanics' liens on oil wells and public works, respectively, to eliminate duplication. Act 200.

H-20. Amend revised statutes relative to issuance of bonds by corporate entities. Act 235.

H-107. Require printed or typed name in addition to signature on documents for recordation. Act 481.

H-130. Amend power tax relative to collection and disposition of receipts. Act 17.

H-132. Technical amendments to severance tax act. Act 449.

H-133. Provide for Louisiana courts to recognize and adjudicate suits brought by other states and political subdivisions thereof. Act 19.

H-134. Dedicate $175,000 out of motor vehicle licenses to collector of revenue for collecting. Act 20.

H-135. Amend revised statutes relative to service of process on foreign corporations. Act 21.

H-136. Amend revised statutes relative to venue of suits against foreign corporations. Act 22.

H-137. Amend administrative provisions relative to collection of state taxes by collector of revenue.

H-138. Amend chain store act relative to imposition of tax on stores opening after January 1 of each year. Act 24.

H-140. Amend revised statutes relative to amounts to be withheld by collector of revenue of taxes on petroleum products. Act 26.

H-142. Amend revised statutes relative to imposition and collection of occupational license tax. Act 105.

H-169. Amend act relative to dissolution of gravity drainage districts. Act 162.

H-235. Provide that where mineral rights are reserved on land acquired by conventional deed or expropriation such rights shall be imprescriptible unless it is specifically provided that such rights shall expire at some earlier date. Act 169.

H-259. Amend act authorizing school boards to grant rights of way across 16 section lands. Act 44.

H-331. Increase state mineral board by two appointive members, change compensation from $10 a day and expenses to $50 a day without expenses. Act 59.

H-348. Amend revised statutes to provide that foreign corporations may qualify to do business in the state for limited purposes but such corporations shall not be entitled to tax exemption granted to certain corporations. Act 349.

H-382. Amend revised statutes relative to refunds of gasoline tax used in commercial fishing, tractors, and farm machinery. Act 371.

H-383. Amend revised statutes redefining lubricating oil. Act 372.

H-403. Amend revised statutes regulating sale of anhydrous ammonia. Act 182.

H-419. Require labeling of all reclaimed or re-refined motor or lubricating oils and require signs where such oil is sold. Act 374.

H-529. Require motor trucks shall not follow another motor truck within 400 ft. on a highway. Act 486.

H-531. Amend revised statutes relative to membership of State Board of Tax Appeals. Act 58.

H-593. (Same as SB-122)—Give Louisiana Liquefied Petroleum Gas Commission power to enforce safety regulations. Act 63.

H-1045. (Sub for HB-139) Amend revised statutes relative to corporation franchise tax. Act 444.

H-1046. (Sub for HB-141) Amend revised statutes relative to income taxes. Act 445.

H-1055. (Sub for HB 953). Providing gross weights for motor vehicles. Act 506.

HAF-Type Plant Planned

HOUSTON.—Work will start within the next 10 days on a new $1,500,000 carbon-black manufacturing plant to be built 8 miles north of Baytown, 20 miles east of here, by J. M. Huber Corp.

The plant will have an annual capacity of 30 million pounds of HAF type carbon black and is scheduled for completion by March 1, 1951. The 300-acre site for the new plant is on the flank of Barber's Hill oil field in Chambers County and a few miles from Esperson Dome field of Harris and Liberty counties. Oil from nearby fields will be used as a raw material for the operation.

The Huber Corp. operates the largest channel-black plant in the world at Borger, Tex. It also owns over 400 producing wells in Texas and three western states.

McCarthy Charters Firm

HOUSTON. — Glenn H. McCarthy, Houston oil man, has chartered New Ulm Corp. with property holdings of $8,250,000 and has borrowed $5,000,000 from Metropolitan Life Insurance Co. for the development of New Ulm oil field and for current operations of McCarthy Oil & Gas Co.

Directors of New Ulm Corp. include McCarthy, A. G. McNeese, Jr., and Herbert R. Eldridge, all of Houston, and H. Hugh McConnell and W. H. Saunders, Jr., New York. New Ulm field is located in Austin County and appears to be a major oil strike. McCarthy discovered the field on a farm-out from Gulf Oil Corp. Gulf and McCarthy split the oil returns, after drilling costs have been deducted from the production. The two control 12,500 acres.

XUM

EUROPE

First Offshore Well

Three companies drilling test at mouth of Elbe River; other German oil activities finding encouraging results

FIRST tidelands drilling in Germany is now under way off Cuxhaven on the North Sea at the mouth of the Elbe River.

Three companies are participating in the well—Preussag, Deutsche Erdoel, and Deutsche Vacuum — with Deutsche Erdoel carrying out the drilling work. The rig has been erected on a steel platform about 1½ miles from the shore at Oxstedt-Spieka, southwest of Cuxhaven.

Materials are being supplied by motor launches, barges, and rafts from a landing stage at the mouth of a small river. The drilling platform is connected with the shore by telephone and shortly will have radio. The derrick is high enough above the sea bottom that work can be carried on regardless of tides.

Other wells.—Other reports on drilling and exploration in Germany show the continued encouraging results being encountered in the country. From a new deviated hole, Eldingen 1, about 11 miles northeast of Celle, produced regularly about 18 cu. m. daily (about 113 bbl.) through a 2-mm. choke from 5,200 ft. Production also was obtained in Eldingen 3, about a mile northwest of the No. 1 well. Gewerkschaft Elwerath is the operator.

Of particular interest is the fact that Eldingen is connected with a faulted anticline. In this respect, Eldingen, like the newly discovered Suderbruch field, differs from other Hanoverian pools which are salt-dome structures.

In Quakenbrueck, the first oil field between Emsland and Hanover, Quakenbrueck 6 of Brigitta and Vacuum came into production. Its location is about 500 ft. from the first successful well in the field. No. 6 went to about 1,900 ft. and, through a 7-mm. choke, produced initially 45 cu. m. daily of a crude with a high paraffin content.

Emmerich 1 of Elwerath, which was to test the geophysical profile of an area on the Lower Rhine, has been abandoned. No traces of oil were found in the hole, though it gave geological information for further exploration.

The German Import Committee has released the second quota of dollar funds earmarked under the Economic Cooperation Administration program for the import of drilling and production equipment. The quota of $534,000 will be used to buy in the United States, among other things, geophysical equipment, another Failing drilling rig, bits, special rotary parts, cementing apparatus, formation testers, core bits, and miscellaneous items. Contracts must be concluded by the end of August with delivery until the end of February.

Drilling record.—In March, 38,300 m. (about 125,000 ft.) were drilled in deeper wells by German operators. This is a new German record and is in part due to the fact that the companies are now using more modern rigs and equipment with which drilling time can be cut and erection and removal accomplished more rapidly. The increase over the February figure is nearly 14,000 m. which is mostly represented by production or field wells.

The 1950 drilling plan drawn up by the German producers called for a total of 477,000 m. The March result indicates this goal will be met, especially since drilling activity normally reaches its peak during the summer months.

New Sterling Deal

Caltex reaches agreement with British Government

AN agreement between California-Texas Oil Co., Ltd., and the British Government which allows the company to make sales for sterling in the sterling area was announced July 18.

The agreement has been expected for several weeks. It represents another major step in the series of individual company arrangements which are being worked out as an immediate solution to the sterling-dollar oil problem.

The Caltex agreement permits the company to accept the British currency in its marketing within the sterling area. Outside the sterling area, Caltex has already arranged in several European countries for local currency sales supplementing regular dollar payment.

W. H. Pinckard, chairman of the board of the Caltex group who has been in London in connection with the discussions, said that the successful conclusion of the negotiations means that Caltex oil refined at its Bahrein refinery from both Arabian and Bahrein crude for distribution in the sterling area only by Caltex (U. K.), Ltd., a British company in the Caltex group, now qualifies as sterling oil.

The agreement provides for a mutually satisfactory reduction of the dollar-cost elements of the Caltex oil sold by Caltex (U. K.), Ltd. Pinckard said the agreement was facilitated by several developments, including:

1. The recent agreement by Arabian American Oil Co. with the British Government allowing Aramco to accept substantial sterling payments from Caltex (U. K.), Ltd., and to use this sterling in current operations.

2. The use by Caltex of its own sterling crude oil produced in Bahrein in mixture with Aramco crude refined at Bahrein for Caltex (U. K.), Ltd.

3. The conversion of tanker freight to a sterling basis.

In the connection with the third point, Pinckard said Caltex is now building seven tankers in the United Kingdom and soon will order two more. All will be employed carrying Caltex products from Bahrein to the sterling area.

Pinckard made it clear that the new agreement is an individual agreement between Caltex as a company and the British Government and that its provisions do not affect the discussions which are understood to be still taking place between the United States and the British Government.

He said that the British ministries concerned in the negotiations had been "most cooperative and helpful in working out this solution with Caltex."

Caltex, owned jointly by Standard Oil Co. of California and The Texas Co., markets throughout the Eastern Hemisphere. It was particularly hard hit last December when the British adopted their policy of substituting British production for dollar oil. The two parent companies each own 30 per cent of Aramco.

Caltex, whose Bahrein production last December was classed as dollar oil despite the fact that Bahrein is under British control, is understood to have arranged with the British Government to bring the dollar component of its costs down to the approximately 30 per cent estimated dollar cost of production of British oil.

The Caltex agreement is the fourth individual company arrangement worked out with the British and made known in the last month and a half. They all mean greater buying in the sterling area by the American companies, and apparently take care of the immediate problem without more prolonged intergovernment negotiations.

No place for Rip Van Winkles

TWENTY years bring changes--changes far greater in our fast-moving world than ever happened in Rip Van Winkle's day.

Americans are awakening to unpalatable facts--that the enterprise system which built our nation and made it strong is being subtly undermined; that advocates of backdoor socialism and communism thrive in our midst; most dangerous of all, that our young people are misinformed on economics.

For example, a recent survey of high school seniors reveals that they estimated that it takes only an $81 investment to provide a job. Actually, as shown by the 1947 census, the 2256 establishments of the iron and steel industry invested $545 per worker that year alone in *new* plant and equipment. Total investment to provide one job runs well above $10,000.

These youth had a similarly distorted picture of profits. They believe shareholders receive 24% of the sales dollar whereas they receive an average of less than 3%.

Misinformed minds are a ready field for imported false philosophies. And it is up to you, a business leader in your community, to take responsibility toward correcting these misunderstandings. The American businessman must not permit himself to be lost in Rip Van Winkle befuddlement.

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XUM

FAR EAST

No Fuels for Reds

British Government yields to American protests, orders companies to halt shipments of oil products to China

Dahl M. Duff

THE British foreign office in London this week announced that British companies marketing in the Far East had been instructed to halt sales of all petroleum products into Communist China.

The action reversed the earlier stand of the British Government on the matter. It headed off the increasing criticism of the British policy in Congress in Washington and elsewhere.

However, motor gasoline and some other petroleum products were reported still moving to the Chinese Communists last week.

The two American companies marketing in the Far East, Standard-Vacuum Oil Co. and California-Texas Oil Co., Ltd., halted petroleum shipments into Communist territory at the request of the State Department.

The British foreign office had refused a request that it take similar action. The Shell organization had continued normal sales, while discontinuing sales of aviation gasoline, had continued to sell other products in conformity with the British Government's decision.

British deny charges.—A British Government official in Hong Kong said published reports that Shell was "moving in" to take the Chinese market of the American companies was "an absolute lie."

A Shell official in that British colony said his company had made no shipments whatsoever to North and Central China since the U. S. State Department request to the American companies. He said Shell was supplying normal commercial uses in South China in the vicinity of Hong Kong but the amount was no larger than formerly and the company was making no effort to increase its trade.

The different commercial policies of the two countries regarding China has long been a sore point with some American oil men. The British have been anxious to preserve their Far East trade, and their recognition of Communist China gave them an advantage in this respect.

Before the Communist overran the Chinese mainland, the total market amounted to some 50,000 bbl. daily, with the three major companies each taking roughly a third. Despite the lack of recognition by the United States Government, the American companies have over the last year been making very small shipments not only through Hong Kong but also into their China terminals. These American sales were cut down to about 2 per cent of the former amount, on an area-by-area basis, as the Communists took control.

Caltex took action halting shipments into Communist China on its own initiative the day following the outbreak of the Korean war and prior to the request made by the State Department.

LATIN AMERICA

Production Peak

Venezuela, Saudi Arabia set new records in June

VENEZUELA'S weekly production climbed to another new-all time high the week ended June 26 with 1,586,866 bbl. daily average.

It was the sixth consecutive week that crude output in Venezuela has set a record. The daily average the week ended June 19 was 1,580,129 bbl. daily.

The record volume of oil now flowing from Venezuela's field has been attributed to greatly improved demand in foreign areas, continuing heavy imports into the United States, and recovery of losses in the strike early in May.

In the week ened June 26, operated production by companies included the following: Creole 675,850 bbl. daily, Mene Grande 271,969 bbl. daily, Shell 511,783 bbl. daily, Socony-Vacuum 36,729 bbl. daily, and Richmond 18,688 bbl. daily.

CHURCH WORK.—At Sidon, Lebanon, on the Levantine Coast of the Mediterranean Sea, these ruins of an Early Christian Church were uncovered by Williams Brothers Overseas Co. workers while ditching for the marine terminal of Trans-Arabian Pipe Line Co.'s system. In the early centuries of this era, the church had been tumbled down by an earthquake a few years after it was built. The Lebanese Government's archeological program required careful removal of the mosaic floor, pillars, and other material before pipe-line construction could proceed.

2 NEW REFINERIES

2 MORE REFINERS HAVE JUST PLACED ORDERS WITH REFINERY ENGINEERING Company FOR NEW CAT CRACKERS. The daily capacity of these Cat Crackers will be 10,000 and 6,000 barrels daily.

2 REASONS WHY REFINERY ENGINEERING Company WAS CHOSEN FOR THE JOB: REFINERY ENGINEERING Company has the experience, ability and construction equipment to build a plant that will give top-notch performance and will be completed on schedule. REFINERY ENGINEERING Company has built a Cat Cracker in 194 working days.

2 WAYS REFINERY ENGINEERING Company CAN HELP YOU: REFINERY ENGINEERING Company can take your plans and build your plant or start with a study of your needs and design, engineer and construct a plant to best fit the competitive situation in your area. In either case, construction will be completed on schedule.

2 WAYS TO GET QUICK ACTION ON YOUR REFINING PROBLEM: Telephone or wire for complete information, without obligation.

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XUM

Another new production record has been reported by Arabian American Oil Co. Output in Saudi Arabia in June averaged 562,640 bbl. daily.

This was the second consecutive record for Aramco. Production in May at 550,911 bbl. daily was the previous all-time peak, exceeding the earlier record of 532,300 bbl. daily in February 1949.

Aramco's record output is due to production to fill the Tapline, amounting to about 35,000 bbl. daily, and to the improved situation regarding currency restrictions. The company has revised its estimated 1950 production to an anticipated 490,000 bbl. daily average.

The report of the new Venezuelan production record came as industry officials speculated on the effect of the Korean fighting on petroleum demand. It is too early yet for the situation to be reflected in runs and production statistics.

One top industry economist anticipated stepped up runs and production would be shown in the near future on the West Coast. Military demand includes heavy fuel oil for shipping as well as light products such as motor fuel and aviation gasoline.

Small amounts of residual and gasoline have been moving from California to the East Coast. These are expected to be discontinued in view of the changed situation in California. The Persian Gulf also will be drawn on to meet the increased military requirements.

Pipe-Line Survey Begun

A Williams Brothers Co. crew is now in the field surveying the route for a proposed products pipe line from Puerto Salgar to Bogota in Colombia.

The Williams Brothers organization on June 26 received a contract for surveying and engineering of the line. This work is due to be completed in 3 months, with the construction contract expected to be let shortly after that time.

The line will be about 160 km. long and is to deliver 7,000 bbl. daily of light products, including diesel, into the Colombian capital. Planned capacity of the line allows for the considerable anticipated growth in the Bogota area market.

Bogota has been dependent on the 220-km. railroad line for its supply of petroleum products. Breaks in the railroad line because of its mountainous route and bad weather have caused products shortages with gasoline rationing in Bogota.

The Salgar-Bogota line will ascend difficult mountainous country, though its maximum elevation will still be below that of the system built by Williams Brothers in Bolivia, which reaches up to 11,000 ft. The elevation at Salgar on the Magdalena River is 570 ft. The route rises to about 8,600 ft. at Bogota with a maximum of about 9,000 ft. some 60 km. before reaching Bogota.

Venezuelan Rig Report

A slight increase in the number of rigs running in Venezuela took place during May.

The total for the month was 92. This represented a gain of four from the previous month, though the total is still 35 under May a year ago.

Of the increase of four rigs from April to May of this year, three were workovers and cleanouts and one was in the exploratory class.

OPERATING RIGS IN VENEZUELA

	May 1950	April 1950	May 1949
Field wells	48	48	76
Exploratory	27	26	38
Workovers, cleanouts	17	14	13
Total	92	88	127

Among the companies, the Shell organization was top with 26 rigs in May, including 2 workovers and cleanouts. Mene Grande had 22, including 3 workovers; Creole was listed for 12, including 6 workovers.

Other companies included Venezuelan Atlantic 6 rigs; Phillips 5; Las Mercedes 5, including 1 workover, and Socony-Vacuum 5, including 1 workover.

Barinas Program Suspended

Socony-Vacuum Oil Co. of Venezuela is temporarily suspending its one-rig drilling program in the Barinas area of Southwestern Venezuela, according to reports from Caracas.

The company is understood to be continuing geological and geophysical work in an attempt to outline further structural prospects. Drilling personnel formerly engaged in the Barinas operation have been transferred to other company operations in Eastern Venezuela.

Socony-Vacuum has completed eight wells in the Barinas area.

MIDDLE EAST

Crude for Haifa

Qatar oil will be shipped around Africa to refinery

CRUDE oil from Qatar in the Persian Gulf will be shipped around the African Continent to provide supplies for the reopening of the Haifa refinery, according to reports from London.

Plans for resuming limited operations at the Haifa refinery were announced earlier in London but the source of crude for the plant was not officially disclosed *(The Oil and Gas Journal, July 6, page 32)*. The Haifa refinery is owned by Anglo-Iranian Oil Co., Ltd., and Shell, with Anglo-Iranian the operator.

Commercial production in Qatar was begun only in January, and its April output was approximately 30,000 bbl. daily. The concession is held by an associated company of Iraq Petroleum Co., Ltd., in which Shell and Anglo-Iranian each have a 23.75 per cent interest.

Uneconomic trip.—The movement of crude some 13,000 miles from Qatar around the Cape of Good Hope and through the Mediterranean to Haifa is completely uneconomic. It is necessitated by the Arab blockade of the Israeli-located refinery.

The tanker voyage in prospect for the crude supplies is about 10 times as long as the straight-line distance from Qatar to Haifa and about 20 times the pipe-line distance from Kirkuk field in Iraq to Haifa. Before it was closed 2 years ago, crude for Haifa, an 83,000-bbl. daily refinery, came from Kirkuk, but the pipe line was closed by Iraq and Egypt refuses passage through the Suez Canal to Haifa-bound vessels.

The Israelis have long been pressing the companies for some arrangement to reopen the refinery. Small-scale operations using Venezuelan crude were tried last year and abandoned. The advantage to Israeli of opening the plant is in the foreign-currency saving, employment for several hundred workmen, and byproduct chemical supplies from the refinery operations. Despite maintenance efforts, the refinery is reported to be threatened with increasing damage from corrosion and disuse.

Because of the long tanker voyage of several weeks, at least 3 months is expected to be needed to build up sufficient crude supplies for the refinery to reopen. In London, opinion differed as to the level of operations that would be attempted. Israeli sources said it would run at a rate of about 20,000 bbl. daily. Oil sources predicted operations at about half this.

No export planned.—It was reported that the arrangement for reopening the refinery contemplates the supply of sufficient crude to meet the share of the Israeli market held by the Shell Oil Co. of Palestine. No export is anticipated. The Socony-Vacuum organization has a marketing position in Israel which presumably will be met from a processing arrangement in the Haifa plant. Formerly the refinery supplied an important part of the general European market.

Of interest was the report that a distillation unit originally intended for the expansion of the Haifa refinery will be used in a new British refinery in Kent, England. This is the 40,000-bbl. daily refinery to be built by Anglo-Iranian on the Thames Estuary in the Isle of Grain area and in which Gulf Oil Corp. is reported to be associated.

PERSONALS

Veteran Refiner

Keeler has been with Phillips since 1924

A VETERAN of the refining industry is W. W. Keeler, vice president of the refining department of Phillips Petroleum Co., vice president of Phillips Oil Co., and vice president and general manager of Alamo Refinery, subsidiary of Phillips Oil, who has been in that division of the petroleum business for more than 20 years.

Keeler began his work with Phillips in 1924 at the age of 16, when he worked during school vacation periods in the company's engineering department, in the Burbank field for the gasoline department, and in the research department's laboratories at Bartlesville, Okla.

A graduate of Kansas University, Keeler joined Phillips as a regular employe following his studies in 1929. From then until 1943 he worked at company refineries in Kansas City, Kans., and Odessa and Borger, Tex., as a chemist, process engineer, night superintendent, and chief engineer. In 1943 he was promoted to technical assistant to the vice president, and was made manager in charge of all Phillips refining operations in 1945. Keeler was elected vice president of the company in 1947.

During World War II he spent a year in Mexico as project manager during construction of a new Mexico City refinery. He also served with the Petroleum Administration for War.

He was elected vice chairman of the executive committee of the Cherokee Indian nation in 1948 and in December 1949 the President of the United States appointed him principal chief of the Cherokees.

D. C. Hemsell, superintendent of the land division for Phillips Petroleum Co., has been named manager of the division at Bartlesville, Okla. Other changes include: **W. B. Weeks,** assistant chief geologist, named manager of the geological section, under **D. E. Lounsbery,** who remains as chief geologist in charge of the division; **A. J. Hintze,** chief geophysicist, named manager of the exploration section; and **W. H. Courtier,** assistant chief geophysicist, made chief seismologist. Various regional assignments have been made, since the company has divided its operating territory into four divisions. They are: Northwest division, **O. H. Whitcomb,** land man, and **J. H. Turner,** transferred from Denver to Bartlesville as division geologist; Southwest division, **H. C. Charles,** land man, and **G. L. Knight,** transferred from Amarillo to Bartlesville as division geologist; Northeast division, **J. S. Williams,** land man, and **H. H. Charles,** division geologist; Southeast division, **J. E. Kendall,** transferred from Houston to Bartlesville as division land man, and **R. E. McPhail,** named division geologist. **H. L. Baldwin** is division landman and geologist for the Canadian division. Other changes include: **N. H. Newman,** land man, transferred from Ardmore, Okla., to Houston; **H. S. Knight,** moved from Evansville, Ind., to Ardmore, Okla., as land man; **C. F. Keller,** moved from Bartlesville to Evansville as land man; **R. I. Sewell,** transferred from Midland, Tex., to Shreveport as land man, replacing **L. B. Tucker,** who resigned; **R. M. Blackmore,** moved from Denver to Salt Lake City as district land man; **A. C. Hornady,** moved from Wichita Falls, Tex., to Amarillo as district geologist; **Andris Haig,** Denver, appointed district geologist there; and **M. H. Steig,** formerly district geologist at Midland, transferred to Bartlesville as special representative handling special problems and assignments.

Roy Pearce, with Phillips Petroleum Co. at Shreveport, has been transferred to the Ardmore, Okla., district as geologist.

Maurice W. Kennedy, The Texas Co., has been named manager of the oil and gas division of Fraser, Burr & Olyphant, TXL Lands, with headquarters in Midland, Tex. He succeeds **Robert G. Carr,** San Angleo, who resigned. **E. L. Zihlman** will succeed Kennedy as district land man for The Texas Co. in West Texas and Southeast New Mexico.

Alvin P. Loskamp, who has been manager of operations of Union Oil Co. of California's West Texas division, Midland, since 1947, has resigned to enter private business, and has been succeeded by **E. R. Atwill,** who has been manager of operations for the Rocky Mountain division with headquarters in Denver.

W. C. Whaley, recently elected vice president and director of Sunray Oil Corp., has been named to direct the California division, which will be referred to as the Barnsdall division of Sunray. The exploration, drilling, and production operations of Sunray and Barnsdall Oil Co. have been consolidated as a result of the recent merger of the two firms. **R. E. Foss** will serve as manager of production and drilling operations; **H. L. Stine** will be assistant secretary and office manager; **J. S. Loofbourow** will be chief geologist; **F. A. Fueller** will serve as manager of land operations; **T. J. Casey** will be counsel; and **R. A. Smith** will serve as attorney. Headquarters will continue in the former Barnsdall offices in Los Angeles' Petroleum Building.

W. C. WHALEY

Craig M. Rowley, with Sinclair Oil & Gas Co. at Bairoil, Wyo., has been transferred to Kiefer, Okla., as district engineer, specializing in secondary recovery work. **Ray Fickel,** geologist, has been transferred to

***ARAMCO PRESIDENT IN ARABIA.**—W. F. Moore, left, president, Arabian American Oil Co., is greeted by F. A. Davies, executive vice president, at Dhahran, Saudi Arabia airport. Moore makes the 9,000-mile trip between New York and Dhahran frequently, and the journey takes about 44 hours' flying time.*

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PERSONALS

Houston from Odessa, Tex. He will be replaced in Odessa by **Don Gibson**, of the Amarillo office. The Amarillo post will be filled by **Corwin Smith**.

H. Ross Bolton, formerly petroleum engineer for Ohio Oil Co. at Terre Haute, Ind., has been named chief engineer of Deep Rock Oil Corp.'s production division, Tulsa, succeeding **K. W. Haley**, who resigned to become manager of exploration and production for Creekmore-Rooney, Inc. Bolton is a graduate of the University of California at Berkeley in 1938, and joined Ohio following his graduation. Haley, who succeeded the late Thomas A. Creekmore at Creekmore-Rooney, formerly was with Barnsdall Oil Co. He joined Deep Rock in 1948.

H. R. BOLTON

R. L. Walker has been advanced from regional mechanical engineer to Houston area drilling engineer by Shell Oil Co. Other recent personnel changes in the area and in the regional staff include: **C. M. Chappell**, computer, named junior geologist; **E. G. Christianson**, division exploration engineer, New Orleans area, transferred to the same job in the East Texas division; **C. J. Frazier, Jr.**, mechanical engineer, transferred to the regional production staff; **Hal J. Jones**, reemployed as junior geologist on the regional-exploration staff; **E. B. Lagucki, Jr.**, mechanical engineer, transferred to the East Texas division from the regional staff; **F. W. Roberts**, design draftsman, transferred from Shell Pipe Line Co. to the regional gas-engineering department; **F. A. Schurtz**, division-production geologist, Tulsa area staff, made regional exploitation engineer; and **W. O. Wottlin, Jr.**, geophysicist, regional exploration staff, named Houston area geophysicist.

John A. Brown, formerly assistant division superintendent, Gulf Oil Corp. pipe-line department, North Louisiana division, Shreveport, has been named division superintendent of the North Louisiana division succeeding **F. C. Vancleave** who is retiring.

F. C. Anderson, formerly assistant to the vice president and assistant secretary of Gulf Oil Corp.-Gulf Refining Co., who has been transferred from the Houston production division to the newly formed Fort Worth production division, has been succeeded by **John S. Trail, Jr.**, in Houston.

Dr. John F. Burst has joined the chemical department of Shell Oil Co.'s Houston exploration and production-research laboratory. Other new employes on the regional staff include: **J. D. Abbott, Jr.**, geologist, regional exploration; **H. R. Coffer, Jr.**, mechanical engineer, area production; **H. C. Finck**, computer, Corpus Christi district production; **K. A. Keenmon, Jr.**, geologist, regional exploration; **G. T. Leslie**, junior geologist, regional exploration; **J. D. Liggett**, computer, Corpus Christi district, exploration; **E. D. Newcomb, Jr.**, laboratory technician, Corpus Christi district exploration; **R. R. Norman**, computer, Houston area; **Berry E. Norris**, chemical department, exploration and production research; **P. Tackenberg**, assistant, seismologist, Houston area; and **W. J. Wilson**, stratigrapher assistant, Tyler district exploration.

W. A. Loftis, district superintendent for Sawyer Drilling Co.'s operations in the Permian basin, has opened company offices in Midland, Tex., with **J. J. Conry** as engineer and **Don Cottier** as office manager.

Don O'Shaughnessy, officer and director of Lario Oil & Gas Co., has been appointed West Texas manager, replacing **George D. Putnam**, who resigned. **R. H. Knox** and **John W. Ruwwe** will continue as district land man and geologist, respectively.

Franklin Rowley, since 1940 assistant general purchasing agent of Esso Standard Oil Co., has been elected a director of Esso Export Corp. His new duties will include coordination of purchases of materials abroad. Rowley joined Jersey Standard in 1920. Before becoming assistant general purchasing agent, he served as buyer for drilling and production equipment and as European coordinator of purchases.

Robert H. Bowden, supervisory process engineer at the Beaumont, Tex., refinery of Magnolia Petroleum Co., has been transferred to the refinery-engineering division of Socony-Vacuum Oil Cc., Inc., in New York.

W. L. Miller, Superior Oil Co., has been elected head of the Houston Oil Scouts and Landmen's Association. New members of the executive committee are: **Phil Lansdell**, Shell Oil Co.; **C. W. McBride**, Phillips Petroleum Co. (also president of Texas Gulf Coast Association); **James E. Rainbolt**, Sun Oil Co.; **Leonard Robinson**, Midstates Oil Corp., and **L. W. Wysocki**, Pan American Production Co.

L. D. Jurs, Oakland, Calif., vice president of Tide Water Associated Oil Co., has retired after more than 39 years of service. He will remain on the company's board of directors, however. Jurs joined Tide Water's engineering department in 1911, and was named chief engineer a year later. He was elected a vice president of Associated Oil Co. in 1927, and in 1936 was elected vice president and a member of the board of Tide Water. He has been vice chairman of the western division operating committee since 1940, and a member of the firm's coordinating committee.

William R. Yinger, petroleum engineer formerly with Sunray Oil Corp. in Kansas and West Texas, has joined the oil-production staff of Allied Materials Corp., Oklahoma City. He is a graduate petroleum engineer from the University of Oklahoma.

Robert B. Ray, engineer at Ozona, Tex., for Magnolia Petroleum Co., has been transferred in a similar capacity to Wewoka, Okla.

T. E. Swigart, president of Shell Pipe Line Corp., has returned from a several-weeks trip to points in Europe. He spent some time at The Hague, the Netherlands, in consultation with officials of Royal Dutch-Shell interests.

David M. Boyd, instrument engineer, Universal Oil Products Co., Chicago, has been granted the degree of chemical engineer from the University of Colorado.

C. W. McBride, Phillips Petroleum Co., has been installed as president of the Texas Gulf Coast Oil Scouts and Landmen's Association. Other new officers are: **B. E. Maxwell**, Humble Oil & Refining Co., and **J. F. McCall**, Amerada Petroleum Co., vice presidents; **T. E. Weatherly**, Pure Oil Co., secretary and treasurer; **George O. Cate**, Humble, year-book editor; and **R. C. Pettit**, Houston Oil Co. of Texas, delegate.

Daniel C. Nufer, Tulsa, who recently resigned from Deep Rock Oil Corp., as area geologist, will open offices in the Atlas Life Building as an inde-

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pendent consulting geologist. Nufer formerly was with Carter Oil Co. and Burke-Greis Oil Corp. before joining Deep Rock.

C. L. Parris, Standard Oil Co. (Ind.), has joined Pan-Am Southern Corp.'s El Dorado, Ark., refinery staff as chief engineer in the technical department under **Harry K. Wheeler,** technical director. Parris, a graduate of Texas Technological College and Illinois Institute of Technology, has been with Standard of Indiana since 1942. **Robert O. Robertson,** engineering - inspection department, Whiting, Ind., refinery, Standard of Indiana, also has joined the technical forces of the refinery. He is a graduate of Iowa State College.

O. E. McClatchey, Tulsa, purchasing agent for the former Barnsdall Oil Co. for the past 30 years, has resigned, but has not announced his plans.

Louis Franklin, Houston geologist and drilling contractor, is in Guatemala engaged in exploration work, with headquarters at Guatemala City.

John A. Loftus, former chief of the State Department's petroleum division who resigned in November 1947 to become professor of economics at the School of Advanced International Studies, has returned to the department as economic adviser for the Bureau of Near Eastern, South Asian, and African Affairs.

Ronald Lestina, Tulsa, has been transferred by Pure Oil Co. to Odessa, Tex., as geological scout.

E. E. Hagan has been transferred from the California Co.'s Natchez, Miss., production office to Hico-Knowles area as engineer in charge. Other recent moves and changes in the company include: **J. R. Black, Jr.,** production, North Louisiana-Mississippi division, Natchez to Lake St. John, La.; **A. R. Cook,** production, western division, Neiber dome to Rangely, Colo.; **W. G. Cutler,** production, western division, Wilson Creek to Gulf Coast division, Harvey, La.; **R. P. Dwyer,** production, engineering staff, New Orleans to North Louisiana-Mississippi division, Cranfield, Miss.; **H. J. Haynes,** production, western division, Denver, to North Louisiana - Mississippi division, Natchez, Miss.; **W. T. Hudson,** production, western division to staff assistant, exploration, western division, Denver, Colo.; **J. R. Lynch,** production, western division, Rangely to Wilson Creek.; **J. L. Martin,** production, western division, Quealy dome to Rangely; **J. R. Meason,** production, North Louisiana-Mississippi division, Cranfield, Miss., to Gulf Coast division, Harvey, La.; **J. C. O'Connor,** production, western division, Casper, Wyo., to Rangely, Colo.; **T. P. Peyton, III,** production, North Louisiana-Mississippi division, Brookhaven, Miss., to Cranfield, Miss.; **F. H. Sievert, Jr.,** production, Gulf Coast division, Harvey, La., to Barataria, La.; **G. P. Stewart,** exploration, western division, Denver to Casper, Wyo.; **W. A. Tarleton,** exploration, eastern division, Lexington to production, Gulf Coast division, Harvey, La.; **H. A. Trueblood,** production, North Louisiana-Mississippi division, Natchez, Miss., to Gulf Coast division, Harvey, La.; **V. A. Walter, Jr.,** production, North Louisiana - Mississippi division, Cranfield, Miss., to Lake St. John; and **W. D. Wilkinson,** Lake St. John to Mid-Continent division, Ardmore, Okla.

D. P. Rogers was elected president of Union Gas Co. of Canada, Ltd., at Chatham, Ont. Other officers include: **R. L. Warren** and **R. L. O'Brian,** vice presidents; **T. Weir,** general manager; and **F. R. Palin,** secretary-treasurer.

V. G. Feather, geologist - seismologist for Honolulu Oil Corp., has resigned and will open an office in Midland, Tex., as a consulting geophysicist. Before going with Honolulu 4 years ago, he was with Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc.

Joseph S. Oppe, assistant director of tankers for the War Shipping Administration during the war and more recently in charge of the tanker division of the Economic Cooperation Administration, has joined the National Federation of American Shipping to head up a new tanker division which will give technical aid and assistance to the organization and its tanker members in matters relating to the building and operation of tankships at the industry level.

DEATHS

James Fleming Carter, Jr., 54, Tulsa, for 25 years advertising representative for Gulf Publishing Co., Houston, died July 14. Carter served for a number of years as vice president and manager of advertising sales for Gulf Publishing in the Mid-Continent area, and held that position until he joined MacRae's Blue Book, a business directory, in 1948. He was a native of Henrietta, Tex., and a graduate of Southern Methodist University.

Franklin Marion Tollett, 74, early-day oil man who was active in the Wichita Falls, Tex., area, died July 12.

August J. Grube, 64, formerly a superintendent of the Bayonne, N. J., refinery of Esso Standard Oil Co., died July 10 at Cranford, N. J. He retired from the company 5 years ago.

Henry Murray McDannold, 50, materials superintendent for Service Pipe Line Co., died July 17 in a Tulsa hospital. He had been with Service, formerly Stanolind Pipe Line Co., since 1922.

Bruce A. Irwin, 48, vice president and general manager of Hammel-Dahl Co., Providence, R. I., was killed in an automobile accident June 14. During World War II he served as secretary of the materials coordinating committee of Petroleum Administration for War, and was chief of the PAW Materials Requirements Section.

Lev H. Pritchard, Jr., 42, Oklahoma City and San Antonio oil operator, was killed in an airplane fire near El Paso, Tex., July 14.

Anson C. Burwell, 60, vice president in charge of production and geology for United Natural Gas Co. and its affiliates, died July 10 in Oil City, Pa. Burwell worked as a junior engineer for the H. L. Doherty interests in Meridian, Miss., before he joined the gas company as an engineer in 1916. He became chief engineer in 1924.

James R. Dougherty, 79, partner in the South Texas oil firm of Hewitt & Dougherty, died in Corpus Christi July 8. He was instrumental in discovering the Tom O'Connor, Greta, Pettus, Flour Bluff, Roach, Sal Viejo, Normanna, Dougherty and Hoffman fields. He was a well-known rancher and attorney in addition to his connections with the oil business. Dougherty was a resident of Beeville, Tex., for more than 50 years.

Waller St. Clair Simpson, 55, oil-production accountant with Socony-Vacuum Oil Co., Inc., in New York, died July 8 in Yonkers, N. Y.

Benjamin T. Conwell, 65, Houston independent oil operator for 20 years, died in Kenilworth, Ill., July 10.

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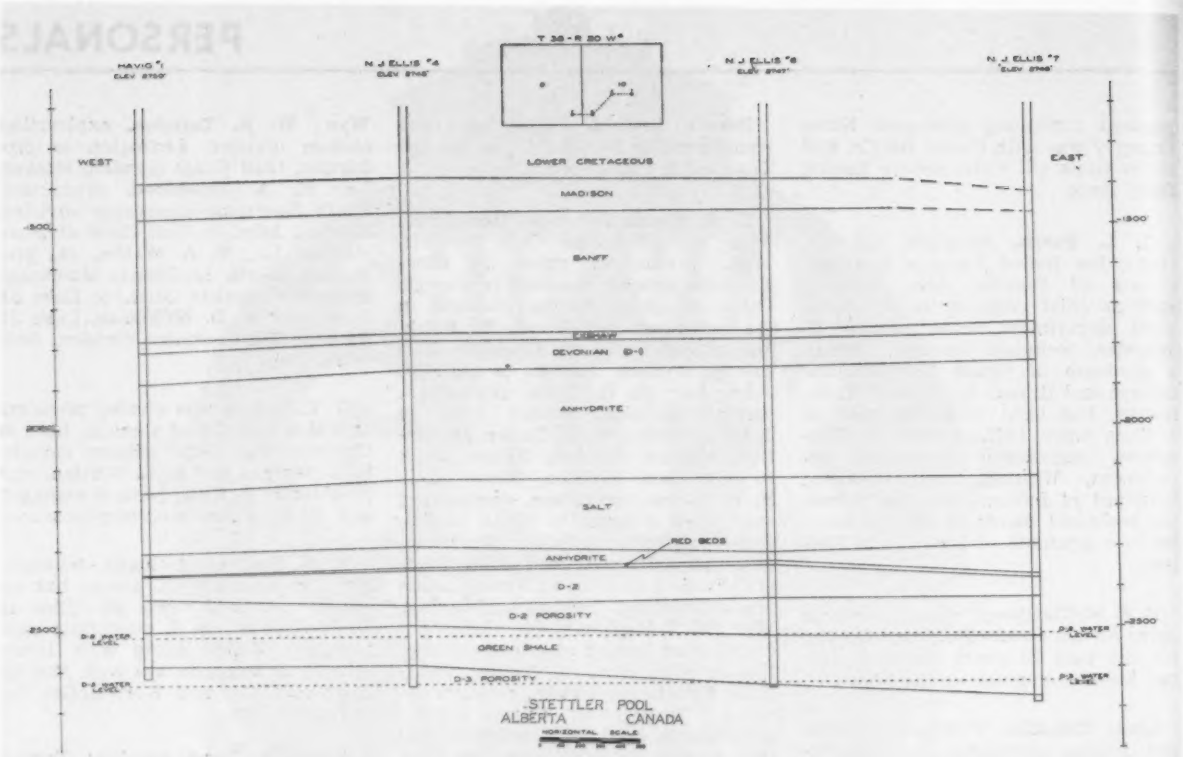


Systematic Development Program Followed by Canadian Gulf Oil Co. In Alberta's Stettler Oil Field

by Philip C. Ingalls
Associate Editor

ALBERTA'S Stettler field might not have been found yet if Canadian Gulf Oil Co. had let a dry hole discourage it and cause the cancellation of its block of acreage in the south-central portion of 38-20w4. The unsuccessful wildcat, located about 90 miles southeast of Leduc field, was drilled on a seismic anomaly which looked too good for the Gulf exploration department to write off. But the next well drilled, after a reevaluation of the structure was made, opened a dual-horizon field of major importance. Thus the actual discovery well itself is illustrative of the systematic exploration and development work done by Canadian Gulf in this area.

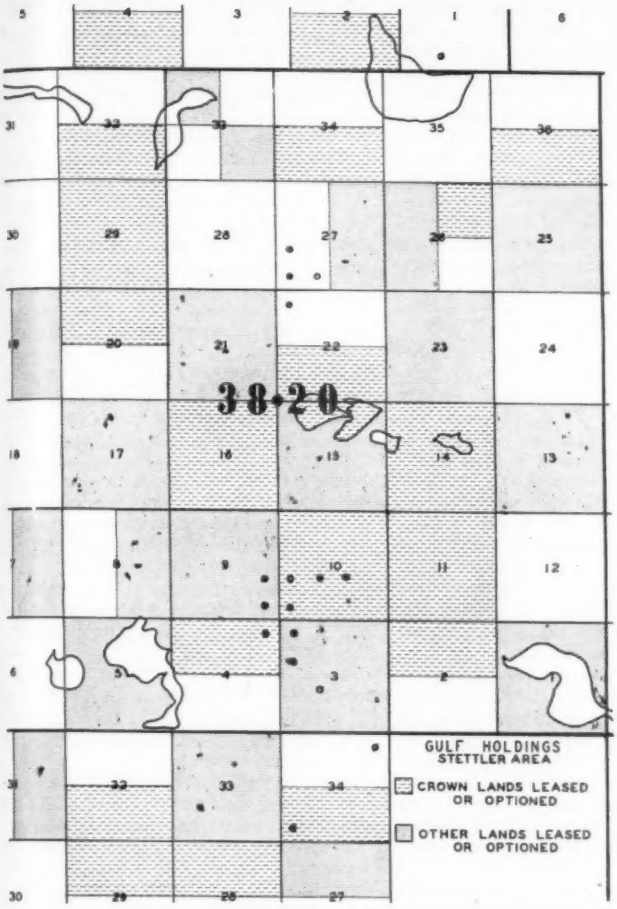
TABLE 1—SUMMARY OF RESERVOIR DATA ON GULF WELLS, STETTLER POOL

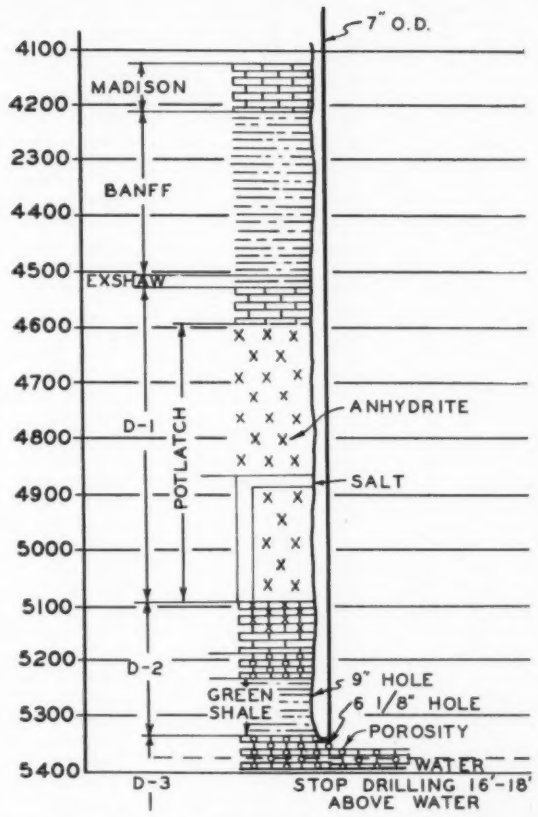
	D-2 zone	D-3 zone
Approximate average pay thickness in wells drilled to date (ft.)	70	40
Porosity (based on one well), per cent	5.5	6.5
Initial bottom-hole pressure, psia.	1,755	1,875
At datum of (ft.)	—2,475	—2,600
Range of productivity indices	*2.5	4-100†
Bottom-hole temperature, °F.	145	146
Saturation pressure, psia.	1,012	1,589
Solution gas-oil ratio, cu. ft. per bbl.	345	465
Formation volume factor	1.22	1.25
Residual-oil gravity, °A.P.I.	29.4	27.2
Residual-oil viscosity at bottom-hole pressure (cp.)	4.4	4.7
Estimated water-oil contact (ft.)	—2,524	—2,634
Probable producing mechanism	Water drive	Water drive

*Based on one well through casing perforations. †Based on four wells, three of which are open-hole completions.

Early Exploratory Wells

Canadian Gulf abandoned its 1 Jerard, LSD 16, 34-37-30w4, at 6,930 ft. after finding only slight oil stains in the D-2 zone reservoir, and 513 ft. of water-loaded D-3 zone. The seismic anomaly on which this well was drilled was further checked and detailed by seismograph and a core-drill program was carried out. After careful reevaluation of the data, both geological and geophysical, the 4 N. J. Ellis was staked in LSD 4, 10-39-20w4, just 1½ miles northwest of the Jerard hole. The 4 Ellis topped the D-2 zone reservoir at 5,184 ft., about 81 ft. higher than the Jerard, and found 50 ft. of oil saturation in the D-2. A





Left—Map of Stettler field, wells, leases. Right—Typical subsurface profile, Stettler field, Alberta, Canada.

TABLE 2—STETTLER AREA—WELL-COMPLETION DATA

Operator, lease, location and date completed—	Initial prod. (24 hr.)	Top formation	Producing interval	Interval exposed	Formation
Canadian Gulf Oil Co.:					
No. 5 Ellis,* LSD 5, 10-38-20; testing	....	5,103	5,143-5,240	5,144-5,240	D-2
	....	5,346	.....	5,346-67	D-3
No. 4 Ellis, LSD 4, 10-38-20; 6-10-49	....	5,097	5,184-5,234	Cased off	D-2
	1,122	5,333	5,333-79	5,330-60	D-3
No. 6 Ellis, LSD 6, 10-38-20; 1-24-50	1,076	5,092	5,173-5,267	5,185-5,253	D-2
	....	5,388	(Below water level)		D-3
No. 7 Ellis, LSD 7, 10-38-20; 4-30-50	1,296	5,125	5,172-5,262	5,170-5,246	D-2
	....	5,418	(Below water level)		D-3
No. 13 C.P.R.-Ellis, LSD 13, 3-38-20; 1-28-50	....	5,105	5,157-5,263	Cased off	D-2
	1,740	5,351	5,356-5,402	5,351-77	D-3
No. 1 C.P.R.-Havig, LSD 1, 9-38-20; 3-6-50	....	5,114	5,171-5,253	Cased off	D-2
	2,004	5,338	5,338-84	5,337-68	D-3
No. 8 C.P.R.-Havig,* LSD 1, 9-38-20; 5-14-50	650	5,114	5,188-5,261	5,177-5,261	D-2
	598	5,354	5,354-80	5,354-64	D-3
No. 16 Combest, LSD 16, 4-38-20; 3-26-50	....	5,151	5,201-87	Cased off	D-2
	1,500	5,365	5,365-5,407	5,366-90	D-3
No. 1 Jerard, LSD 16, 34-37-20; 1-26-48	Dry hole	5,226	.....	.....	D-2
	....	5,548	.....	.....	D-3
No. 1 Bauer, LSD 4, 34-37-20; 9-21-49	Dry hole	5,204	.....	.....	D-2
	....	5,429	.....	.....	D-3
British Empire:					
No. 1, LSD 4, 27-38-20; 12-3-49	700	5,186	5,192-5,240	5,194-5,224	D-2
No. 2, LSD 5, 27-38-20; 6-10-50	768	5,172	5,178-?	(?)	D-2
	....	5,440	(Below water level)		D-3

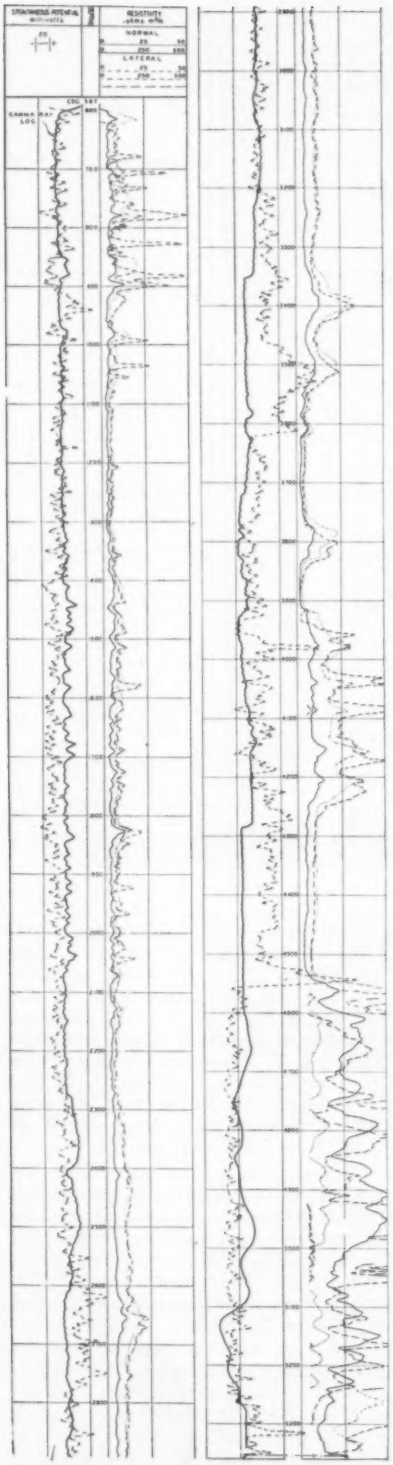
*Dual completion.

drill-stem test of the interval 5,184-5,234 ft. flowed 29.3° oil at a rate estimated to be in excess of 1,000 bbl. per day. At about 5,320 ft. the top of the D-3 zone was encountered, approximately 180 ft. higher than the Jerard well. A production test of the interval 5,333-79 ft. yielded 1,122 bbl. of 27.4°-gravity oil per day. The well was completed at a total depth of 5,385 ft. in June 10, 1949.

Gulf then moved 2 miles south to a location set diagonally across the section from the dry and abandoned Jerard well (see map) and staked its Bauer well in LSD 4, 34-37-20w4. This hole topped the D-2 zone at 5,204 ft. and was abandoned as a dry hole on September 21, 1949.

The next well drilled in the Stettler area was British Empire 1 Stettler in LSD 4, 27-38-20w4, about 3 miles north of Gulf's Stettler discovery well. This well found production in the D-2 zone, topped at 5,186 ft., but found the D-3 zone wet. The well flowed 700 bbl. of oil per day on a production test of the interval 5,192-5,240 ft.

After completing the unsuccessful Bauer well, Gulf went back to the 4 Ellis well and began offsetting. So far this year Gulf has completed eight producers in eight attempts which, as shown in Table 2, have an average



Electric and gamma-ray log of Canadian Gulf's 8 C. P. R. Havig, located LSD 8, 9-38-20w4; electrode spacings AM 16 in., A 63 in., AO 24 ft.; mud resistivity 0.1 ohms at 65° F.; gamma-ray time constant = 2, sensitivity = 20.

initial of over 1,000 bbl. in 24 hours.

As shown by the accompanying cross-section, the Madison, while thinning slightly to the northeast, is present in the Stettler area. Before the discovery of D-3 production at Stettler, all D-3 production found was from reefs updip toward the granite shield from the Madison pinchout, and a fear had developed that perhaps prolific D-3 production would be confined to an area where the Madison was not present. The strike at Stettler disposed of this fear and lifted any restricted thinking about the possibilities for production under the Madison covered area.

Production Practices at Stettler

Oil production from Stettler pool is limited to British American purchases which, during April, totaled 600 bbl. per day from seven wells. Wells are flowed at a rate of 15 to 20 bbl. per hour and each well is operated 3 or 4 hours each day. The wells flow readily with no tendency to bleed off and die. No water is produced with the oil and the wells have produced at rates as high as 1,200 bbl. per day for short intervals without making any water or excess gas.

Producing gas-oil ratios consistently equal the solution-gas ratio. The oil in both the D-2 and D-3 horizons contain less gas than could be dissolved in the oil under the existing pressures. There is, accordingly, no free gas in the pool and the gas-oil ratios should conform to the solution-gas figures. Single-stage separators are operated at about 35 psi. Shut-in pressures on the tubing range from 450 to 500 psi.

Oil gathering.—As yet no paraffin difficulties have been encountered. The oil is pumped from the stock tanks to a loading rack through approximately 9,000 ft. of 4-in. line at rates of about 140 bbl. per hour. Pump pressure is about 50 psi. Pour points of the oils range from 35° to +20° F. In actual practice oil has been pumped to the loading rack when the stock-tank oil temperature has been as low as 0° F., with no difficulty.

Drilling Practices at Stettler

The rigs used at Stettler are of medium depth rating (5,000 ft.), and use jack-knife derricks. Except for more elaborate weathering in and a heating boiler during the winter, they are essentially the same as the standard United States drilling rig of the same depth rating. Since a continuous supply of natural gas for fuel is not available, butane or diesel fuel is used.

The drilling, casing, and mud programs are designed for the particular section penetrated and the completion procedure. A typical subsurface section in the Stettler area is shown, which indicates the particular problems involved.

Mud practices.—In general there are no drilling or mud problems above the top of the D-1 zone. Approximately 600 ft. of 10¾-in. o.d. H-40 casing is cemented in a 13-in. hole with 350 sacks of cement which is sufficient to circulate to the surface behind the pipe. A 9-in. hole is drilled below the shoe of the surface pipe to the top of the D-1 using a mud program which consists primarily of clear water dilution of the natural muds made by the formation.

The gas-bearing Viking sand, which must be protected in other areas in Alberta, particularly at Redwater, is shaled out in Stettler. It has been established by a rather intensive program of coring and drill-stem testing that there is little, if any, possibility of gas production from this horizon within the present limits of Stettler pool.

The Potlatch section is encountered just below the top of the D-1 zone and consists principally of anhydrite with salt and shale in the lower portion. Prior to penetration of the Potlatch section, the mud is pretreated to prevent the serious consequences involved in heavy and uncontrolled gyp contamination of the mud. Three to four pounds of plasterer's mix (calcium sulfate) per barrel of mud is added coincidentally with water dilution to accomplish the gyp contamination of the mud under controlled conditions. Thus the effect of gyp contamination is minimized by spreading it over a longer period of time and the employment of appropriate remedial action.

Between 1,200 and 1,800 lb. of plasterer's mix with water dilution keeps the viscosity of the mud at an acceptable figure of approximately 35 seconds. Complete assimilation of the gyp into the mud system is indicated by a drop in viscosity to 30 to 32 seconds and a rise in water loss. Starch is then added to reduce the water loss of the gyp-contaminated mud to an acceptable value, and preservative is added to prevent deterioration of the starch. After this pretreatment, and drilling operations are not affected while that treatment is going on, the anhydrite, salt, and shale of the Potlatch member of the D-1 zone are penetrated without any further alteration of the mud characteristics.

No appreciable circulation losses are encountered in the D-2 zone but some loss of fluid always accompanies penetration into the D-3 zone. Prior to entering the D-3, 7-in. o.d. J-55 casing is cemented with approximately 400 sacks of cement. About 300 ft. of scratchers and centralizers are installed on the 7-in. casing from the shoe up; cement fillups of from 1,400 to 1,600 ft. are achieved.

Bits; coring.—Penetration below the shoe of the 7-in. into the D-3 zone is taken with either a 6⅛-in. rock bit or diamond core barrel. The present policy is to core one well on each 160 acres.

Drilling time from spud to the top of the D-3 is usually 27 to 28 days. Running casing, waiting on cement, drilling or coring the D-3, placing the well on production, and tearing down rotary tools requires approximately

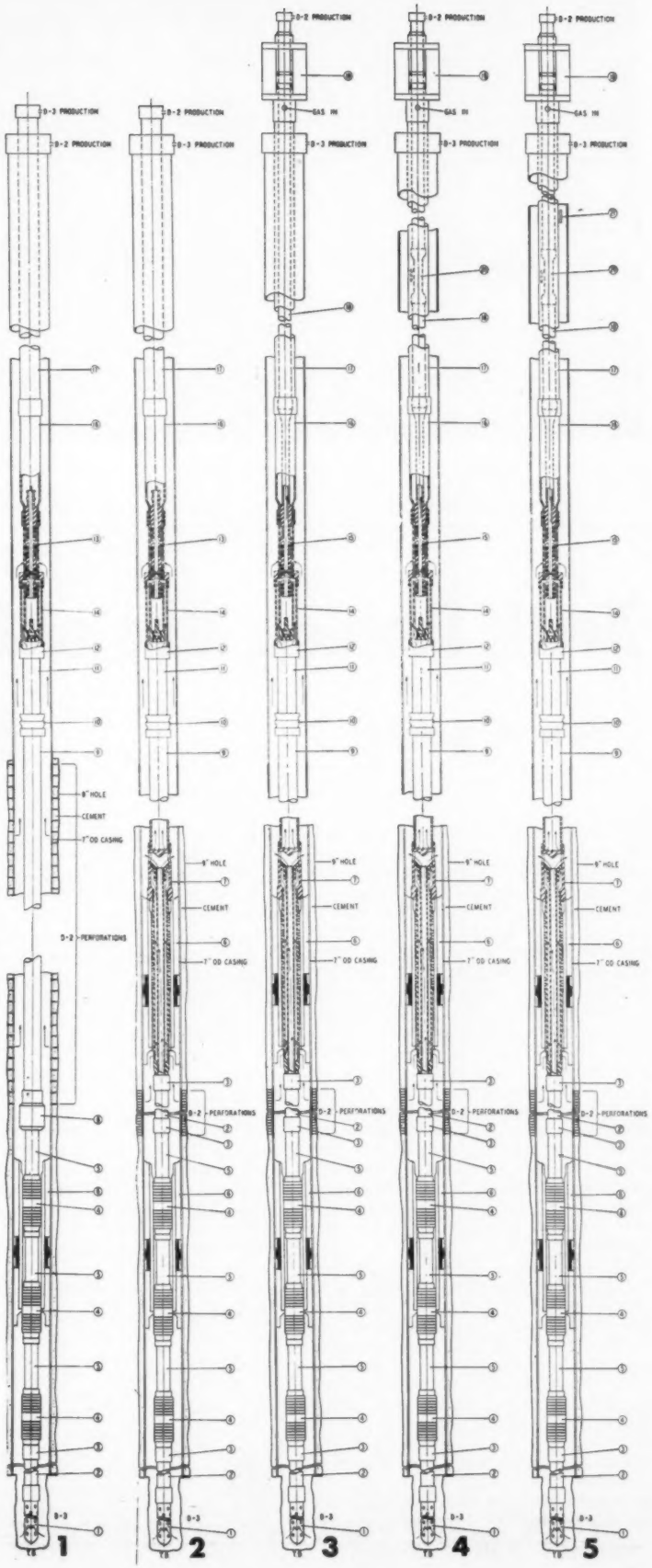
Dual-zone completion flow diagrams, Stettler area.

1. Baker Model "D" packer
D-2 Production through 7-in. casing
D-3 Production through 3½-in. o.d. tubing
2. Upper packer and crossover assembly
D-2 Production through 3½-in. o.d. tubing
D-3 Production through 7-in. casing
3. 2⅜-in. o.d. Hydril tubing inside 3½-in. o.d. tubing
D-2 zone can be produced by gas lift through 2⅜-in. o.d. tubing
4. Flow valves on 2⅜-in. o.d. tubing to gas lift D-2 production.
5. Flow valves on both 2⅜-in. o.d. and 3½-in. o.d. tubing strings to gas lift both D-2 and D-3 zones.

LEGEND

Bill of Material

1. 2⅜-in. o.d. EUE 8 round-thread by 8-ft. mud anchor.
2. 2⅜-in. o.d. EUE 8 round-thread tubing.
3. 2⅜-in. o.d. EUE 8 round-thread by 10 round-thread sub coupling for Baker sealing nipple (No. 13).
4. Baker multi-V tubing-seal nipple (No. 13).
5. Baker spacer nipple with coupling 10 round thread.
6. Baker model "D" retainer production packer (No. 87) for 7-in. o.d. 23-lb. casing.
7. Baker model "D" anchor-type changeover flow tube with 2⅞-in. o.d. EUE 8 round thread box up and 10 round thread pin down.
8. Sealing nipple locator sub 2⅞-in. o.d. top.
9. 2⅞-in. o.d. EUE 8 round-thread tubing (1 joint).
10. Baker safety joint with left thread for 2⅞-in. o.d. EUE 8 round-thread tubing.
11. 2⅞-in. o.d. x 24-in. long EUE 8 round-thread nipple.
12. 3½-in. o.d. EUE 8 round-thread by 2⅞-in. o.d. EUE 8 round-thread sub coupling.
13. 2½-in. Otis type "K" removable side door choke.
14. 2½-in. Otis type "K" landing nipple adapted for use with 2-in. tubing inside 3-in. tubing.
15. 2½-in. Otis type "K" removable side-door choke adapted for use with 2-in. tubing inside 3-in. tubing.
16. 2⅞-in. o.d. by 3½-in. o.d. Otis type "J" slot nipple.
17. 3½-in. o.d. EUE 8 round-thread tubing.
18. 2⅜-in. o.d. EUE tubing with type "S" Hydril joint.
19. Type "H" flow head.
20. Flow valve on 1½-in. by 2-ft. nipple with Hydril joint.
21. Flow valve on 3½-in. o.d. tubing.



10 additional days. Extensive coring or drill-stem testing programs in either the D-2 or D-3 zone increase the over-all time.

There are no particularly hard or abrasive sections to be penetrated in the Stettler area and straight-hole drilling does not present much of a drilling problem. One surface-hole bit and nineteen 9-in. rock bits are generally required to reach the top of the D-3 zone. One 6⅛-in. rock bit or core head is usually adequate for penetration below the 7-in. casing shoe.

Well-Completion Details

In Stettler pool proper the oil-water contact is fairly well established in both the D-2 and D-3 zones. It is

(Continued on page 104)

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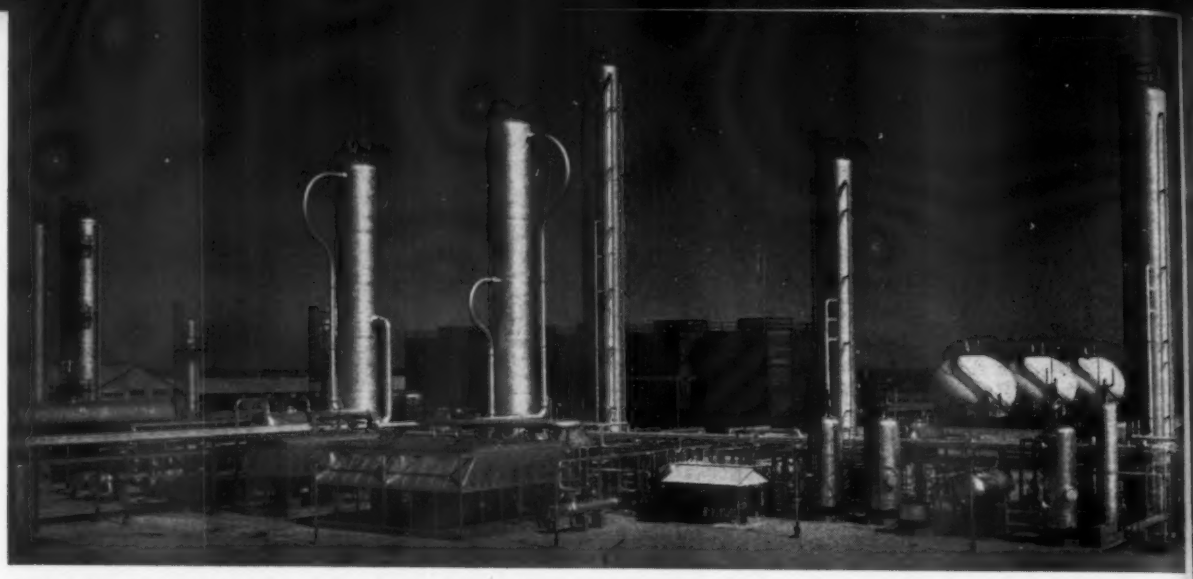


General view of North Cowden gasoline plant near Odessa, Tex., which provides facilities for one of the world's largest gas-injection programs. Pictured is a portion of the process area, with the cooling tower and 5,000-bbl. spheroidal gasoline storage tanks visible in background. Plant can currently process 50 million cubic feet of gas daily, recovering about 150,000 gal. of natural gas liquids from that amount of gas. This total includes 35,000 gal. of propane, 23,000 gal. of butane, and 93,000 gal. of 26-lb. R.v.p. natural gasoline. The plant's capacity can easily be doubled by installing certain items of equipment.

North Cowden, One of Nation's Largest Projects, Now in

by N. H. Rahmes*

ONE of the largest cooperative gas-injection projects ever inaugurated has been placed in operation in North Cowden field, Andrews and Ector counties, Texas. In order to carry out the gas-injection project it was necessary to construct a large high-pressure gasoline and injection plant.

This project has a dual purpose; namely, to increase ultimate oil recovery from the Grayburg formation and to permit the processing of all gas produced from the field. Benefits from the standpoint of conservation of natural resources can be measured in two ways: (1) ultimate oil recovery will be materially increased, and (2) substantially all of the liquid hydrocarbons will be recovered from the gas prior to its injection into the formation.

North Cowden field is located on the Andrews and Ector County lines about 25 miles west of Midland, Tex. The field was discovered in October 1930, but active development was not commenced until 1934. By 1941, development of the field was essentially completed. The field covers some 27,000 acres on which 680 producing wells have been drilled on 40-acre proration units. Approximately 7,900 acres were initially underlain by a gas cap. Accumulative oil production at the end of 1949 is termed "West Texas sour," having approximately 1.78 per cent sulfur by weight and an average 32° A.P.I. approximated 79,000,000 bbl. The oil gravity at 60° F.

The producing Grayburg formation of Permian age is found at a depth of about 4,400 ft. The gross thickness of original gas saturated section in the gas-cap area averaged 55 ft., while the average gross oil saturated interval approximates 90 ft. The pay consists of sand and dolomite near the crest of the structure which grades to pure dolomite on the east flank. The structure is an elongated anticline with the major axis trending northwest-southeast. The structure has about 800 ft. of relief between the crest and the down-dip limit of production as depicted by Fig. 1, which shows general structural conditions.

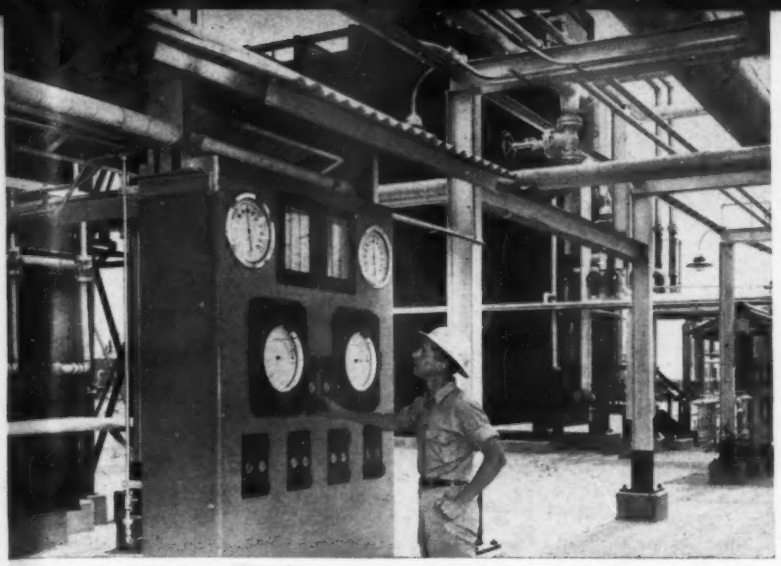
Internal Gas-Expansion Drive

The North Cowden Grayburg reservoir has operated predominantly under an internal gas-expansion drive. No effective water drive is present, although a small amount of water (400 bbl. per day) is produced around the periphery of the field. Original reservoir pressure was approximately 1,800 psi. As is characteristic of this type reservoir, pressure has declined continuously and had reached a value of 727 psi. by December 1949. Originally, 562 cu. ft. of gas was in solution in a barrel of residual oil near the top of the structure, with small quantities in solution near the down-dip limits of the field.

The cooperative gas-injection program has been carried out by dividing the field into injection blocks of approximately 640 acres each. This was done in order to expedite the gas-injection program since it was evident at an early date that very lengthy negotiations would have been required to form a field-wide unit. To date, 33 such injection blocks have been formed, comprising a total of approximately 20,500 acres. The project is starting out with one injection well in each block located as shown on Fig. 1. Ultimately, it is expected to have a minimum of two injection wells in each block. Thirty-two oil operators (owners of 80 per cent of the developed acreage in the field) have joined in the program. The opportunity to enter the program is still open to the royalty and working interest owners in the field who have not yet joined.

Present plant capacity is 50,000 M.c.f. per day, but the plant is designed for ultimate enlargement to 100,000 M.c.f. per day by adding to certain equipment, principally compressors, heat-exchange equipment and utility features, and by paralleling certain process services. Design gas composition is shown in Table 1.

*Stanolind Oil & Gas Co., Tulsa.

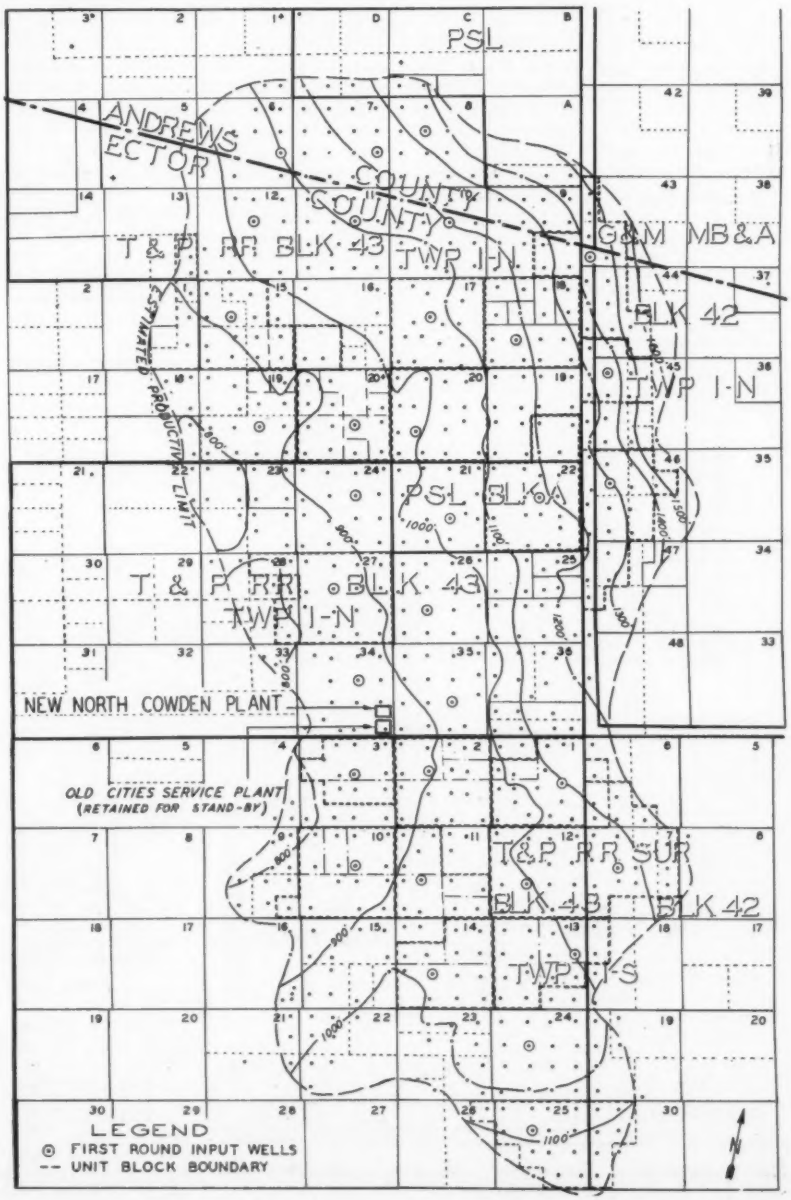


A portion of the power plant area. Robert E. Schmidt, engineer helper, adjusts the steam pressure on the Wickes gas-fired boilers which may be seen in the background. The boilers each have a capacity of 42,500 lb. of 300-psi. steam per hour.

tem is cascade. Product treating facilities include a regenerative caustic unit which removes mercaptans from depropanizer bottoms, a batch caustic wash, followed by dehydrators, for propane and solid copper chloride treaters for gasoline.

Design and construction of the plant was by Stearns-Roger Manufacturing Co. in conjunction with Stanolind Oil & Gas Co. and other plant owners. Stanolind operates the plant for a group of 21 owners. (See

Fig. 1—(Right) Map of North Cowden field, Andrews and Ector counties, Texas. The surface formational contours (interval equals 100 ft.) on top of lime—total structural relief of production is over 800 ft.



Gas-Injection Operation

The plant is designed for 60 per cent propane recovery and essentially 100 per cent recovery of butanes and heavier. Liquid products, when processing 50,000 M.c.f. per day of gas of the design composition shown, are expected to total 150,000 gal. per day. (See Table 2.)

Process features include monoethanolamine sweetening of gas and condensate after the second stage of compression, oil absorption at 700 psig., solid desiccant dehydration of residue gas, and compression of residue gas to 1,700 psig. for injection. The absorption-distillation cycle includes a reabsorber for recycle vapor and a two-still distillation section. The three-column fractionation sys-

TABLE 1—DESIGN GAS COMPOSITION

Component—	Mol %
Nitrogen	2.55
Hydrogen sulfide	1.00
Carbon dioxide	1.48
Methane	74.65
Ethane	9.62
Propane	4.30
Butanes	3.22
Pentanes	1.59
Hexanes	1.01
Heptanes and heavier	0.58
Total	100.00

TABLE 2—DAILY PRODUCTION AT 50,000 M.C.F. PER DAY

Product—	Gal.
Propane	35,000
Butanes	22,700
Natural gasoline (26-16 R.v.p.)	92,700

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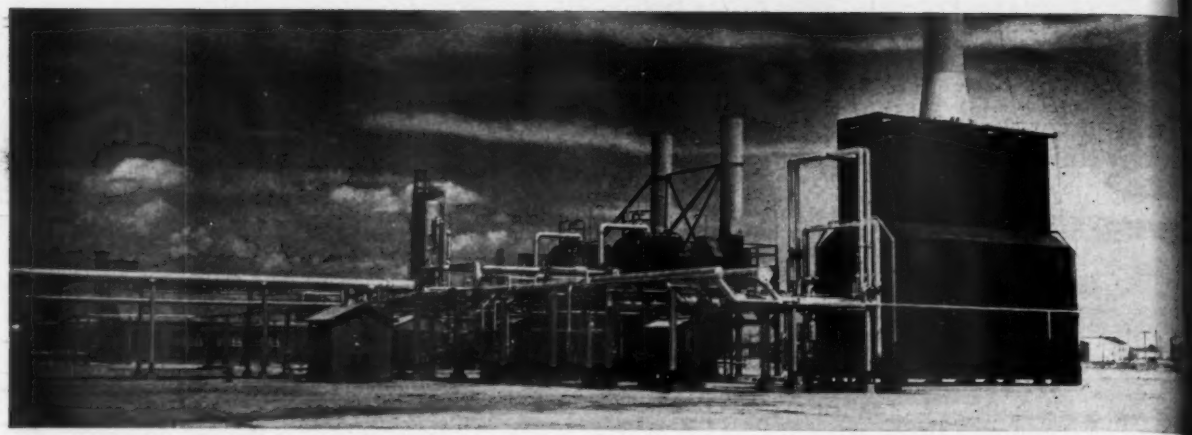

The power-plant area at North Cowden. Pictured are the two gas-fired boilers, each with a capacity of 42,500 lb. of 300-psi. steam per hour, and a direct-fired heater, which has a capacity of 36 million B.t.u. per hour.

Table 3.) These same parties also own the older gasoline plant in the field which was purchased from Cities Service Oil Co. to handle the gas volumes in excess of 100,000 M.c.f. per day and which is presently being held in standby condition.

Compression.—Field gas is gathered from 171 batteries at a maximum gathering system pressure of 10 psig.

TABLE 3—NORTH COWDEN PLANT OWNERS

Acme Oil & Royalty Co.
Amerada Petroleum Corp.
Atlantic Refining Co.
Cities Service Oil Co.
Continental Oil Co.
Delaney, Aline C.
Kervin, D. E.
Kiska Oil Co.
McBee, William D.
McDonald, Ocie Virginia
Mid-Continent Petroleum Corp.
Ohio Oil Co.
Reigle, Edward E., Trustee
Richmond, Iva C.
Sinclair Oil & Gas Co.
Stanolind Oil & Gas Co.
Sun Oil Co.
The Texas Co.
Texas Gulf Producing Co.
Tide Water Associated Oil Co.
Whitted, Janice Florine

Gas enters the plant through four meter runs and passes into a large horizontal scrubber designed to catch solid particles or crude oil that may enter through the field lines. Pressure in the scrubber is maintained at approximately 2 psig. by compressor speed control.

The compressor installation consists of ten 1,600-hp. units installed in two separate compressor houses. The five compressors in one building are equipped with three stages and discharge at 717 psig. The five compressors in the second building are equipped with four stages, the first three stages paralleling the corresponding stages of the three-stage machines, and the fourth stage serving to compress residue gas to 1,700 psig. for injection. Each group of compressors has a separate closed jacket water system with air cooling.

Hydrogen sulfide removal is accomplished after the second stage, and third stage discharge gas goes to the oil absorber (Fig. 2). Second and third-stage-compression conden-

TABLE 4—SCHEDULE OF TOWERS

Name—	Size	No. of trays
Main absorber	72 in. x 57 ft. 0 in.	25
Reabsorber	60 in. x 60 ft. 6 in.	25
Vapor amine contactor	90 in. x 66 ft. 0 in.	25
Liquid amine contactor	30 in. x 50 ft. 0 in.	30 ft. packing
Amine regenerator	96 in. x 68 ft. 0 in.	3 and 40 ft. packing
Primary still	114 in. x 66 ft. 0 in.	27
Secondary still	114 in. x 66 ft. 0 in.	27
Deethanizer	66 in. x 64 ft. 0 in.	26
Depropanizer	66 in. x 91 ft. 0 in.	40
Debutanizer	72 in. x 71 ft. 0 in.	30
Gas dehydrators (2)	66 in. x 25 ft. 0 in.	....
Copper chloride treaters (2)	72 in. x 12 ft. 0 in.	....
Propane dehydrators (2)	36 in. x 16 ft. 6 in.	....
Caustic contactor	60 in. x 32 ft. 0 in.	20 ft. packing
Caustic regenerator	36 in. x 37 ft. 0 in.	3 and 20 ft. packing

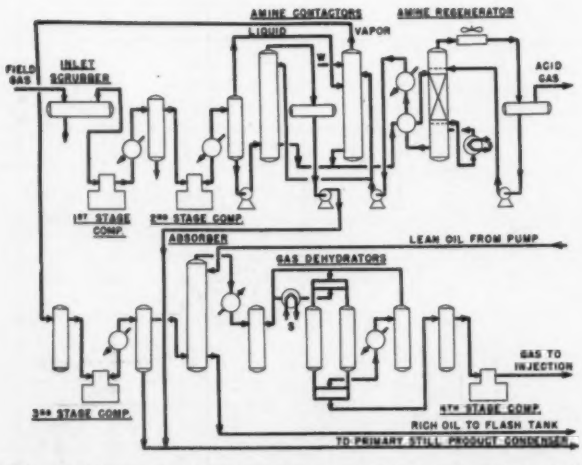

Fig. 2—Diagram of compression, sweetening, absorption, and dehydration.

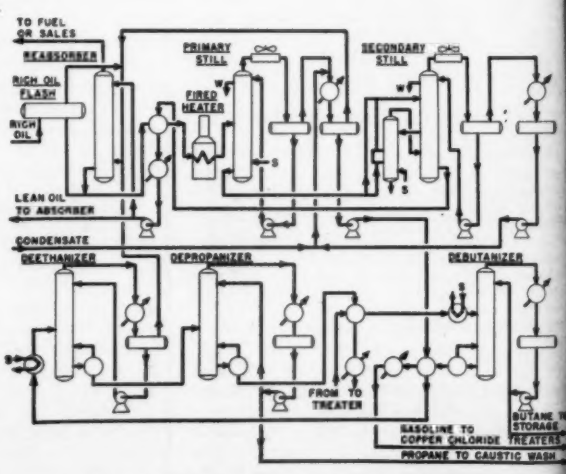

Fig. 3—Diagram of distillation and fractionation.

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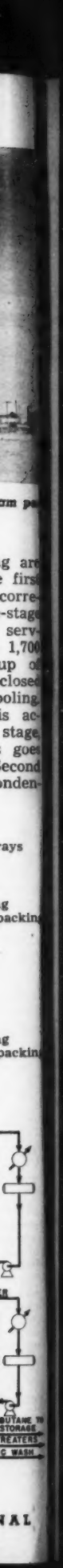

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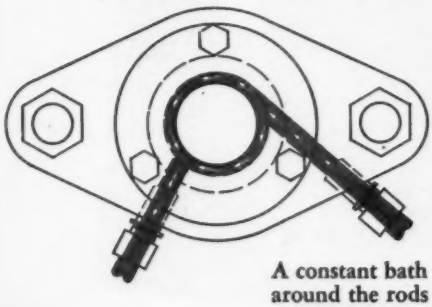
Western PRESSURE-LOCK LUBRICATING STUFFING BOX GLAND

A positive circulating oil bath system adaptable to all high or low pressure mechanical pumps

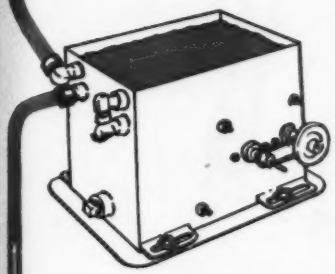
Pat. Pend.

Designed to replace standard rod oilers of the usual injected grease and gravity flow liquid types. Provides a pressure lubricating system that gives positive seal at the liquid end of the pump.



LUBRICATES THE STUFFING BOX PACKING AND COOLS THE RODS

A constant bath of undiluted lubricating oil around the rods eliminates most of the friction by lubricating the packing. A tight seal is maintained with this gland attached to your present stuffing box and shut-downs for repacking are greatly reduced.

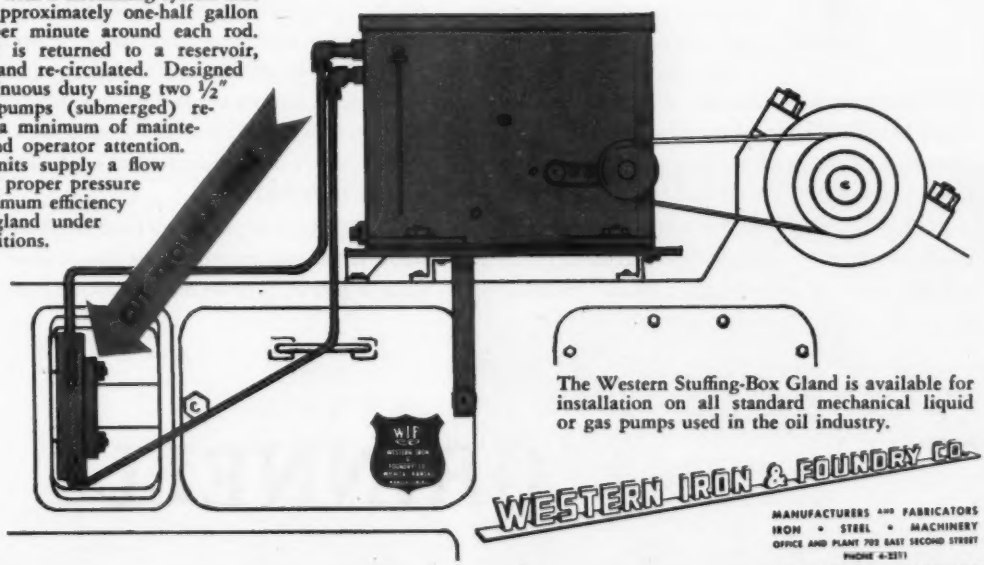


ELIMINATE AIR KNOCKS . . . IMPROVE PERFORMANCE

Installations already made in the field have eliminated air knocks caused by air entering the cylinder through the packing. In most cases, these installations have increased pump pressure without increasing the R.P.M. In every instance, pump performance is definitely improved since 10% of your pump power could otherwise be dissipated due to friction of the packing against the rods.

Mounting hole centers are the same as original equipment on your pump; just take the old glands off and replace with money-saving Western pressure-lock lubricating glands.

The Western Stuffing-Box Gland is supplied with a circulating system that pumps approximately one-half gallon of oil per minute around each rod. This oil is returned to a reservoir, cleaned and re-circulated. Designed for continuous duty using two ½" Viking pumps (submerged) requiring a minimum of maintenance and operator attention. These units supply a flow of oil at proper pressure for maximum efficiency of the gland under all conditions.



The Western Stuffing-Box Gland is available for installation on all standard mechanical liquid or gas pumps used in the oil industry.

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Grinnell integrates the many factors in this complex, highly technical assignment in one organization of specialists. Major economies result from this single responsibility which includes interpretative engineering, metallurgical research, compliance with code requirements, manufacturing drawings and specifications, production schedules, purchase of materials, specialized facilities, skilled personnel, control of quality and rigid inspection.

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sate is collected for processing. Residue gas from the oil absorber is dehydrated and then goes to the fourth stage.

Hydrogen sulfide removal. — Second-stage discharge gas after cooling passes through a scrubber for separation of condensed hydrocarbons and water and then goes to the vapor amine contactor. Lean monoethanolamine is pumped over the contactor at a design rate of 234 g.p.m. and removes hydrogen sulfide to less than 0.25 grains per 100 cu. ft. in the overhead.

Hydrocarbon condensate collected in the scrubber is pumped through a liquid amine contactor counter-current to a small stream (about 4 g.p.m.) of lean amine. The sweet condensate flows through a settler which catches entrained droplets of amine and then is pumped to the fractionator feed tank.

Rich amine from the bottom of both contactors joins and is heated by exchange with hot lean amine before entering the top of the regenerator. As the rich amine flows down through the tower, hydrogen sulfide and carbon dioxide are stripped from it by steam rising from the reboiler. Design steam rate to the reboiler is 17,600 lb. per hour. Lean amine flows from the bottom of the tower through the exchanger and cooler to the circulating pump suction where it is picked up and pumped back to the contactors.

Regenerator overhead is air cooled to about 160° F., to condense most of the steam, and then enters a reflux accumulator. Condensed steam is pumped from the accumulator back to the regenerator as reflux and the acid gas is flared. Water to make up that lost with the acid gas is pumped onto the water wash tray in the vapor contactor and serves to minimize amine loss in the overhead gas.

Auxiliary equipment to the amine unit includes a filter which removes suspended material, particularly iron sulfide, and a redistillation unit or amine reclaimer.

Residue gas system.—Residue gas from the main absorber is cooled and then, after plant fuel is removed, flows to a solid-desiccant dehydration unit (Fig. 2). Two dehydrator towers are used, one being on stream while the other is being regenerated and cooled. The cycle is designed on a basis of 12 hours dehydration and 12 hours regeneration with downflow during dehydration, upflow during heating, and downflow during cooling. Regeneration gas rate is about 400 M.c.f. per hour.

Dehydrated gas passes through a special scrubber equipped to contact the gas with oil to remove particles of desiccant and thereby protect the fourth-stage compressor cylinders. Fourth-stage discharge gas goes directly to the injection system without cooling.

Dehydrated residue gas is also furnished to the leases for fuel. Provisions have been made to sell residue gas not required for injection or for plant and lease fuel.

Absorption and distillation.—Primary absorption is carried out at 700 psig. with a design lean oil rate of 461 g.p.m. Rich oil from the bottom of the absorber is flashed at 287 psig. in the rich-oil vent tank (Fig. 3). Vapor from the vent tank, along with recycle from the fractionator feed tank and deethanizer overhead, is contacted with 193 g.p.m. of lean oil in the reabsorber at 187 psig. The reabsorber is equipped with one intercooler.

Reabsorber overhead may be used for plant fuel but ordinarily goes to carbon-black sales where it is particularly desirable because of its relatively high heating value.

Reabsorber bottoms join flashed rich oil from the vent tank and the combined stream is then exchanged with secondary still bottoms, heated to about 500° F. in the fired heater, and fed to the primary still.

The primary still is operated at about 197 psig. and sufficient stripping is accomplished to operate the secondary still totally condensing. Design steam rate is about 1,900 lb. per hour. Partially stripped oil from the bottom of the primary still is fed to the secondary still where stripping is completed at 52 psig. Secondary still steam rate is about 7,200 lb. per hour. Both stills employ air cooling for condensing reflux and water cooling for final condensation of product.

Secondary still make is pumped to a point just ahead of the primary still product condenser where it, along with second and third-stage compression condensate, enters and aids condensation of primary still net product. Total light-hydrocarbon make is accumulated in the fractionator feed tank.

Lean-oil end point is controlled by an oil purifier. A small stream of primary still bottoms is fed to the purifier and normally all secondary still stripping steam passes through the unit which vaporizes all but the heavy ends of the oil. The accumulated residue in the bottom of the purifier is periodically drawn off to slop.

Fractionation. — Unstabilized liquid product is fed to the deethanizer, Fig. 3, after being exchanged with debutanizer bottoms and being preheated to 230° F. Three alternate feed trays are provided. Column control is accomplished by a level controller on the reflux accumulator which sets steam rate to the reboiler. Reflux is flow controlled, the design ratio being 1 to 1, reflux to feed.

Deethanizer overhead contains essentially all of the ethane and lighter materials in the feed and enough propane to allow condensation of reflux at the operating pressure, 482 psig. Deethanizer bottoms feed directly to the depropanizer.

The depropanizer operates at 232 psig. and makes propane of about 97 per cent purity overhead and an essentially propane-free bottoms. Design reflux ratio is 1.5 to 1, based on feed, and there are three alternate feed trays. Depropanizer bottoms are charged to a caustic contactor for partial removal of mercaptans prior to entering the debutanizer. The de-

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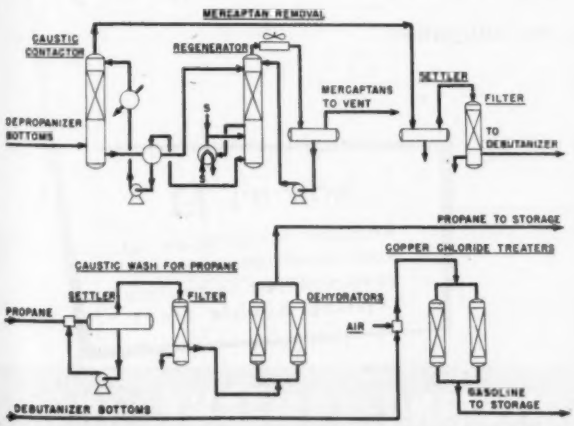

Fig. 4—Diagram of product treating.

The cooling tower at North Cowden.

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KOCH KASKADE
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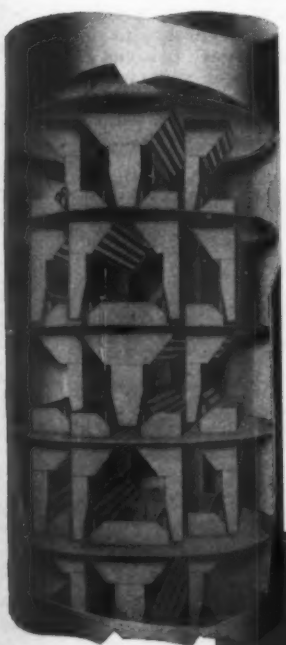

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NEUTRALIZATION OF SPENT CAUSTIC

. . . with flue gas

by Kenneth M. Brown* and Soma Kurtis†

THE caustic solutions used for chemical treatment of petroleum products are the most obnoxious types of waste material with which a refiner has to contend, and they present a serious disposal problem with most refiners.

Waste-disposal experts tell us that waste material being discharged into surface water (1) should not be toxic to aquatic life, (2) have no chemical oxygen demand, (3) not change the pH of the surface water into which it flows, (4) not impart a bad taste or a disagreeble odor, (5) not increase the total solids content of the water into which it flows beyond a certain maximum, and (6) not cause the surface water to become unsightly or discolored or make it turbid. All of these items taken collectively mean that the waste should not change the environment or the nature of the water enough seriously to affect the aquatic life or to make its treatment for subsequent use by others excessively expensive.

Spent caustic soda from petroleum refining contains almost all of the things that a suitable waste should not. Certain phenolic compounds are reported by some authorities to be toxic to fresh water fish in concentrations of 1 to 10 p.p.m.[1] Almost all spent caustic contains phenols, often referred to as acid oils, particularly those caustic solutions that have been used to treat either thermally cracked or catalytically cracked gasoline. Almost all spent caustic contains sulfide which ionizes to hydrogen sulfide. Hydrogen sulfide is toxic to fish in concentrations as low as 0.9 to 6.5 p.p.m.[1] Certain chemicals will oxidize under mild conditions, robbing aquatic life of necessary oxygen. Sulfides, sulfites, and thiosulfites have an oxygen demand as shown by the following chemical equations.

*Universal Oil Products Co. †Aurora Gasoline Co. Paper presented at regional meeting, Western Petroleum Refiners Association, Wichita, Kans.

Chemical Oxygen Demand of Some Sulfur Compounds

$$Na_2S + \tfrac{1}{2}\,O_2 + H_2O \rightarrow 2\,NaOH + S \quad (1)$$

$$2\,Na_2S + 3\,O_2 \rightarrow 2\,Na_2S_2O_3 \quad (2)$$

$$Na_2S_2O_3 + \tfrac{1}{2}\,O_2 \rightarrow Na_2SO_4 + S \quad (3)$$

$$Na_2SO_3 + \tfrac{1}{2}\,O_2 \rightarrow Na_2SO_4 \quad (4)$$

It is only when the sulfur has been oxidized to the sulfate that it no lonegr has an oxygen demand.

A change in pH is a shock to aquatic life. Caustic solutions are reduced in pH by dilution as can be seen in Table 1.

It can be seen from Table 1 that a caustic waste having a pH of 14 and a concentration of say 7.5 per cent NaOH (10° B.) must be diluted to 20,000 times its original volume to get to 10 pH which is necessary to avoid damaging the more tolerant forms of aquatic life. To get the pH below 8, the range in which most aquatic life will continue to habitate the water, it must be diluted to 2 million times its original volume. Thus it is seen that a relatively large stream is necessary to reduce the alkalinity of caustic waste.

Waste caustic contains many compounds such as mercaptans, sulfides, thiophenols, phenols, and others which will impart an undesirable taste and odor when discharged to surface water. If the surface water is subsequently treated with chlorine to render it fit for drinking, the phenol content is extremely important. It must be less than a few parts per billion in order to avoid a medicinal iodoform taste.

TABLE 1—pH OF NaOH AND HCl SOLUTIONS

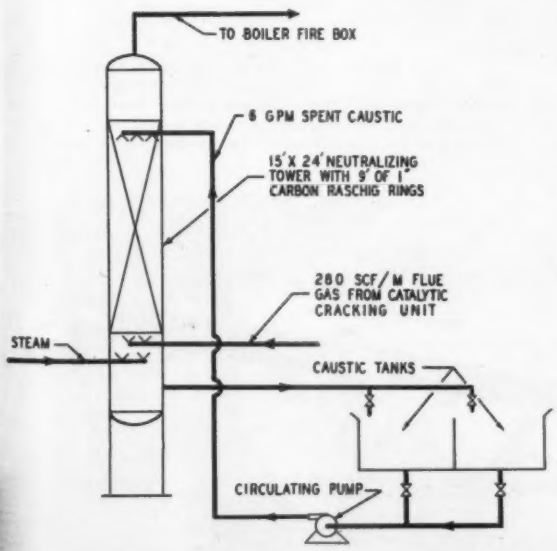
°B.	% NaOH or % HCl	Normality	pH
51	50	20	14
36	30	10	14
22	17	5	14
9	7.5	2	14
2.8	3.8	1	13.1
0.5	0.4	0.1	13.0
0	0.04	0.01	12.0
0	0.0004	0.0001	10
0	0.000004	0.000001	8
0	0	0	7
....	0.000004	0.000001	6
....	0.00036	0.0001	4
....	0.036	0.01	2
....	0.36	0.1	1.02
....	3.6	1.0	0.9

Dissolved solids are objectionable above a certain maximum concentration. According to Hart this upper limit of toleration for fish is about 350 p.p.m.[1] Also, high concentrations of solids can render water unfit for future use. Hart[2] reports that surface waters contain about 70 to 400 p.p.m. of total dissolved solids and in 50 per cent of the water it is less than 170 p.p.m. Waste containing 10 per cent total solids must be diluted to 1,000 times its original volume to get it below 100 p.p.m.

Certain phenolic compounds present in refinery spent caustic act as dyes or indicators at the proper pH and may cause serious problems when the caustic is dumped into surface waters. Spent caustic can also cause the water to become turbid through the introduction of sulfates which combine with calcium and magnesium in the surface water to form insoluble sulfates, and it can also cause precipitation of carbonate through the familiar water-softening reaction which involves the formation of calcium and magnesium carbonate from their respective bicarbonates. Also, free sulfur may be liberated as shown in Equations 1 and 3 above.

$$NaOH + Ca(HCO_3)_2 \downarrow Na_2CO_3 + CaCO_3 + H_2O$$

Turbidity is objectionable since it reduces the amount of light penetration which is necessary for plant life. Thus it is seen that almost all of the materials in spent caustic are objectionable when discharged into surface water. If the body of surface water is large enough, the discharged material will eventually be diluted to the point where it is not objectionable.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STEAM
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Fig. 1—Caustic neutralizing pilot unit, at Aurora Gasoline Co.

XUM

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8963 feet drilled in 37 days. That's how fast this "Oil... No. 96 Rig with No. 1500 Triple-Engine drive goes down at r... drilling speeds. No effort was being made to break records. The ... especially liked the easy and accurate control, the smooth ope... brakes and the abundant power for handling long strings of drill...

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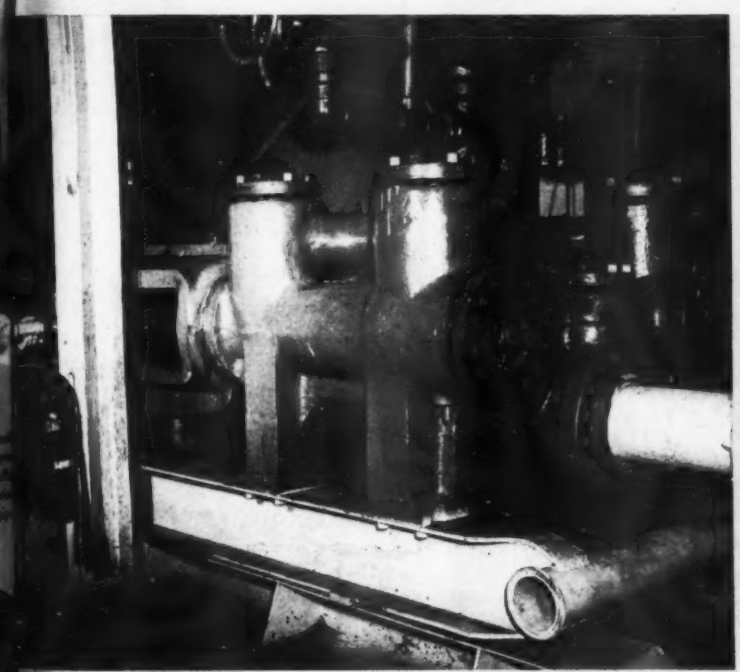

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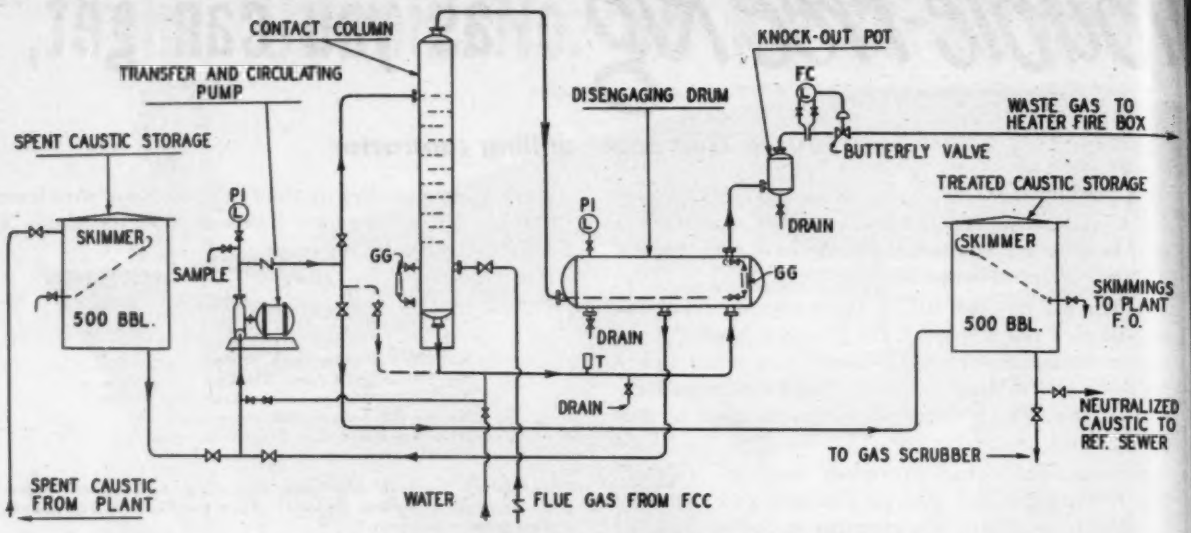

Fig. 2—Spent caustic neutralizing unit, Aurora Gasoline Co.

Also the so-called "self-purification" of water will eventually render the waste material unobjectionable provided the waste does not kill the microorganisms that are active in self-purification. Where the amount of waste is large relative to the body of water into which it is discharged, it can cause serious damage.

The use to which surface water is to be put and the amount of self-purification it will undergo should determine the amount of treatment given to industrial waste-water effluent. Such a policy has been adopted in the Administration of Public Law 845, according to Carl E. Schwob in his address before the May 1950 meeting of the A.P.I. Refining Division in Cleveland. Not all local authorities take such a logical stand.

Types of Waste Caustic

Not all waste caustic contains the same components and the use to which the caustic has been put will determine to a large degree the type of treatment that is best to render the waste caustic fit for disposal. Caustic used for treating light fractions such as L.P.G. or natural gasoline or light straightrun gasoline will contain only sulfides and mercaptides, principally sulfides, and, of course, a certain amount of free alkali.

Caustic used for the treatment of thermally cracked gasoline may contain sulfides, mercaptides, phenolates, thiophenolates, and salts of naphthenic and aliphatic acids. All of these materials, with the possible exception of the salts of aliphatic and naphthenic acids, are objectionable.

Caustic used for treatment of catalytically cracked gasoline will be composed almost entirely of phenolates, thiophenolates, and some mercaptan sulfur. There may also be a small amount of sulfide.

Caustic used for treatment of kerosine may contain sulfide and mercaptide and may also contain salts of naphthenic acids. This type of caustic usually is high in neutral oils.

The materials removed by caustic are known as weak organic acids. It is a well-known principle in chemistry that a stronger acid will displace or liberate a weaker acid from its salt. For example: hydrochloric acid will liberate acetic acid from sodium acetate; acetic acid will liberate hydrogen sulfide from sodium sulfide; hydrogen sulfide will liberate mercaptan from sodium mercaptide, etc.

Table 2 lists various organic acids that are found in petroleum products in the order of decreasing acidity. Hydrogen chloride is included, not because it is ordinarily found in refined petroleum products or in spent caustic, but merely to show the relative strength. Also, certain basic compounds are included for comparison.

TABLE 2—COMPARISON OF STRENGTH OF ACIDS AND BASES

	Ionization constant	pH of 0.1 Molar solution
Acids—		
HCl	10^{2}	1.0
Acetic acid	1.8×10^{-5}	2.9
Propionic	1.3×10^{-5}	
Butyric	1.5×10^{-5}	
Typical naphthenic acid*	1.2×10^{-5}	2.60
Carbonic acid	3.4×10^{-7}	3.7
Hydrogen sulfide	3.3×10^{-7}	3.7
Thiophenol	1.5×10^{-7}	3.9
Thiocresol mixture	1.0×10^{-8}	
Phenol	1.1×10^{-10}	5.0
Ethyl mercaptan	2.3×10^{-11}	5.8
Propyl mercaptan	1.5×10^{-11}	
Water	0.6×10^{-14}	7.0
Bases—		
Ammonium hydroxide	1.75×10^{-5}	11.1
Sodium hydroxide	10^{1}	13.0

*Pentamethylene carboxylic acid.

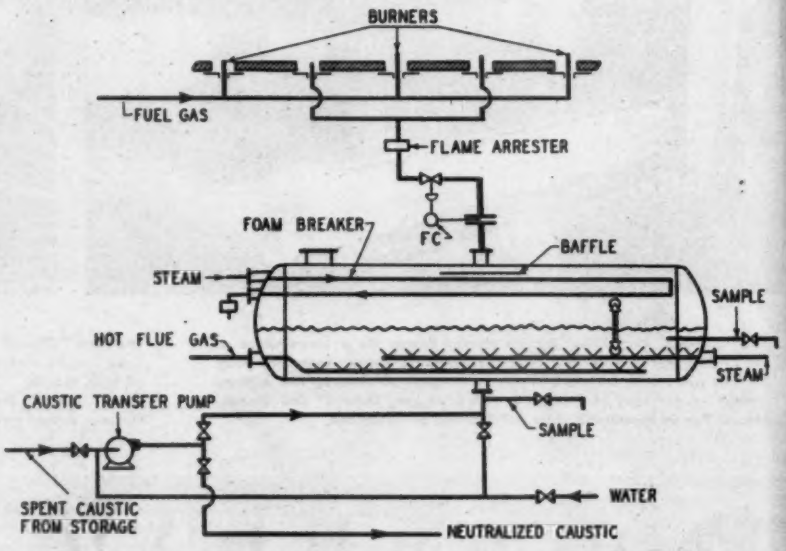

Fig. 3—Caustic neutralizer using flue gas from catalytic cracking unit.

The strength of the acid is shown by the ionization constant. The smaller the exponent, the weaker the acid.

Another and probably more familiar method of expressing acid strength is shown by pH which is also included in Table 2. It will be noted that carbonic acid has the same strength as hydrogen sulfide and that carbonic acid is a stronger acid than the phenols and mercaptans. Acetic acid and naphthenic acid are stronger than carbonic acid. This means that acetic acid will liberate carbon dioxide, hydrogen sulfide, phenol, etc. Carbonic acid, which is the acid formed when carbon dioxide dissolves in water, will liberate phenol, mercaptans, etc.

Although carbon dioxide is of the same strength as hydrogen sulfide, it will liberate hydrogen sulfide when present in a large excess provided that the liberated hydrogen sulfide is carried away from the solution. Table 3 shows the pH of some sodium salts of the various acids shown in Table 2. A mixture of caustic with these various sodium salts, which is the condition in the spent caustic solution, will usually have the pH of the free alkali since this is a much stronger base than the sodium salt of the alkali and a weak acid. Thiophenol can be liberated by carbon dioxide if the liberated material can be removed by stripping vapors.

While the use of carbon dioxide for neutralizing caustic is a well-known chemical reaction in a qualitative way, putting such a neutralizing process into actual operation, using flue gas as a source of carbon dioxide, presents several problems.

In the first place the flue gas is usually available at atmospheric pressure and in order to be used must have the pressure raised by a blower or compressor. Flue gas is not corrosive as long as it is hot. Almost all fuels burned contain sulfur, and therefore all flue gases contain sulfur dioxide. When the flue gas is cooled below its dew point, water condenses and this water then dissolves the sulfur dioxide forming sulfurous acid which is one of the most corrosive acids known. The use of a compressor then is almost eliminated since the compressor must be run on cool flue gas, and it would require expensive acid-resistant equipment to cool the flue gas and remove the sulfur dioxide. Fans can be used on hot flue gas but the pressure output is limited to 10-14-in. of water. The use of flue gas from a stack is not advantageous because of these limitations, and flue gas has not been used widely by the refining industry for neutralizing caustic.

As the need for caustic disposal became more critical, refiners became more willing to install expensive equipment if they could have some assurance of beneficial results. Fortunately for many, the advent of catalytic cracking in its improved postwar design, makes flue gas available

TABLE 3—ACIDITY OF SODIUM SALTS OF CERTAIN ACIDS OCCURRING IN UNFINISHED PETROLEUM PRODUCTS

Compound—	pH of 0.1 M solution
Sodium chloride	7
Sodium sulfate	7
Sodium acetate	8.9
Sodium naphthenate	9.0
Sodium bicarbonate	8.5
Sodium carbonate	11.5
Sodium sulfide	13.0
Sodium bisulfide	10.7
Sodium thiophenylate	9.9
Sodium phenolate	11.0
Sodium ethyl mercaptide	11.8

at 15-20 lb. pressure, thus overcoming one of the most difficult obstacles in the use of flue gas for caustic neutralization. It was natural, therefore, that Aurora Gasoline Co., having the first postwar catalytic cracking unit, would be the first to make a trial with flue gas when its caustic-disposal problem reached a climax.

The original Aurora Gasoline Co. pilot unit design is shown in Fig. 1. It involved passing hot flue gas from the downstream side of the catalytic cracking-unit waste-heat boiler upward through a vertical tower which contained carbon Raschig-ring packing. The flue gas leaving the top of the tower passed directly into a boiler fire box. Spent caustic collected in

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TABLE 4—SPENT CAUSTIC NEUTRALIZATION, AURORA PILOT UNIT

	Spent caustic	
	Before neutralization	After neutralization
Appearance before filtration	copious black ppt.	copious black ppt.
After filtration	yellow, strong H_2S odor	clear, good odor
Total alkalinity (M. O. end point) calculated as NaOH, %	10.9	7.70
Sodium mercaptide calculated as NaOH, %	0.32	nil
Sodium sulfide calculated as NaOH, %	8.6	nil
Sodium hydrogen sulfide calculated as NaOH, %	2.0	....
Sodium carbonate and bicarbonate calculated as NaOH, %	....	1.70
Phenols, % (approx.)	0.2	0.2

one of the caustic tanks was circulated over the top of a vertical Raschig-ring-packed tower coming in contact with the rising flue gas as it flowed down over the rings. Steam injection was provided to prevent excessive evaporation in order to avoid dehydration, and to prevent the caustic concentration from getting into the range where caustic embrittlement would become a problem. The efficiency of carbon dioxide utilization, assumed to be 25 per cent for design purposes, turned out to be about 50 per cent for the few analyses made.

Table 4 gives the composition of a sample before and after neutralization in the pilot unit. Experience in the early unit showed that the liberated phenols did not form a separate acid oil layer, undoubtedly due to the fact that they were distilled from the solution almost as rapidly as they were liberated. The temperature in the neutralization system was considerably below the boiling point of the phenols but the stripping action of excessive quantities of gas passing through the solution carried out the phenols as well as the more volatile constituents such as mercaptans and hydrogen sulfide.

This early neutralization system at Detroit was hurriedly designed and built almost overnight from existing equipment. Experience gained with it led to the development of a better system which was described briefly by J. C. Albright.[5] More recent developments are worth mentioning.

Fig. 2 is a simplified flow diagram of the Aurora unit. Flue gas from the catalytic cracking unit is taken downstream from the waste-heat boiler and has about 10-12 per cent CO_2, 5-6 per cent CO, 1½ per cent O_2, and the remainder nitrogen and inerts. At this point the temperature is 450°-500° F. The neutralizing system includes two 500-bbl. tanks—one to accumulate spent caustic and one to hold neutralized caustic to permit liberated acid oils to separate for skimming and to permit the laboratory to check before authorizing disposal to the sewer.

An all-iron centrifugal pump charges a batch of spent caustic over the top of a vertical contact tower which is fitted with 10 perforated side-to-side pans. Flue gas introduced at the bottom rises through this tower, coming into intimate contact with the downflowing liquid. A batch of spent caustic, after dilution to 10°-12° B., amounts to about 1,700-2,000 gal., and is charged at a rate of about 10 g.p.m. About 80 per cent of the sulfide is eliminated while a batch is being charged.

The flue gas leaving the top of the tower enters a horizontal disengaging drum through an internal perforated distributor which provides additional contacting. The liquid from the bottom of the tower also flows into this drum. After a batch is charged, the charge pump suction is switched to circulate the liquid from the disengaging drum back over the tower until neutralization is complete; upon which the liquid is pumped to the 500-bbl. treated storage tank.

The flue gas passes from the disengaging drum through a butterfly control valve to the fire box of a process heater where the hydrogen sulfide,

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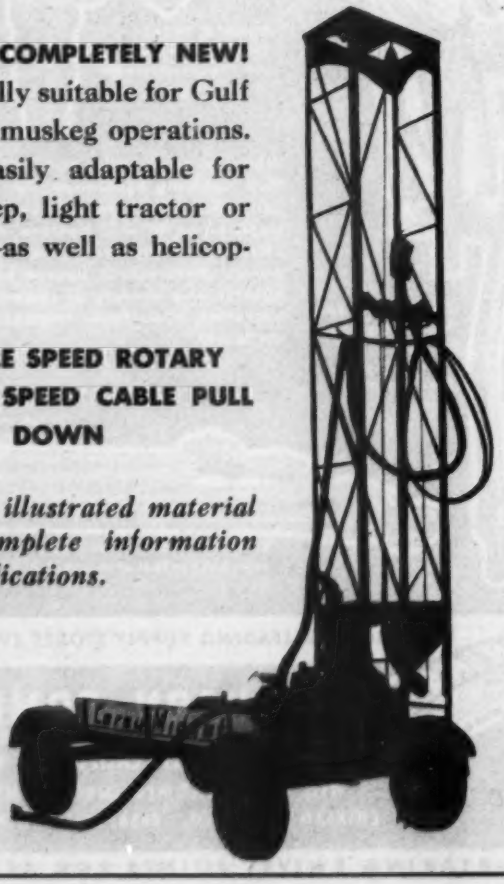

mercaptans, phenols, and other objectionable components are burned.

Certain operational difficulties have been encountered. These can be divided into three classes: (1) foaming, (2) acid oils, and (3) solids.

1. Foaming.—Spent caustic from the kerosine doctor-sweetening unit contains salts of naphthenic acids. When this caustic was included in the neutralizer charge, severe foaming resulted. Antifoaming agents such as isoamyl and octyl alcohol were useful in reducing foam formation; however, the Dow-Corning antifoam agent known as "DC Antifoam A" was found to be very effective at concentrations in the range of 50 p.p.m.

This particular caustic does not contain sulfide and is no longer a part of the charge to the neutralizer.

2. Acid oils.—When caustic solutions from cracked gasoline containing about 40 per cent acid oils are neutralized without dilution with other alkaline wastes, the acid oils accumulate in a separate phase. If sufficiently diluted, the acid oils are stripped out by the flue gas.

3. Solids.—It is necessary to keep the gravity of the charge below about 10°-12° B., otherwise crystals of carbonate and bicarbonate will form and cause difficulty due to plugged lines.

The inlet line is insulated to keep the flue gas above its dew point and no corrosion difficulties have been encountered after 9 months of service with steel equipment.

Neutralization is considered complete when the sulfide ion reaches 0.2 per cent or less by potentiometric titration with silver nitrate. At this point the hot carbonated solution is free of odor. A laboratory test is made for phenols. The field test consists of a check for sulfide with lead acetate paper. Three to four 1,700-gal. batches can be neutralized per day.

In addition to the unit at Aurora, two more units have recently been installed by Rock Island Refining Co. and by Globe Oil & Refining Co. The Rock Island unit was placed in operation in the middle of May this year and the Globe unit a month later. These new units are similar to the unit shown schematically in Fig. 3.

TABLE 5—SPENT CAUSTIC AVAILABLE AT ROCK ISLAND

	From catalytic gasoline treating	From straight-run gasoline treating
Gravity, °B.	26	10-12
Total alkalinity, % NaOH	17.6	6-8
Per cent spent*	9.8	>50
pH	10.6	.....
Acid oil by liberation with acid, vol. %	30	.....
Phenols (by ultraviolet), %	24	.....
Thiophenols (by ultraviolet), %	1.3	.....
Na_2S, calc. as NaOH, %	1.3	.....

*Per cent spent

$$\frac{\text{cc. acid to M. O. end point} - \text{cc. acid to p.p. end point}}{\text{cc. acid to M. O. end point}}$$

Experience gained on the Aurora unit and the desire to build a simpler, less-expensive unit led to the new design. Flue gas passes through a distributor located in the bottom of a horizontal vessel coming into intimate contact as it passes through the caustic solution in the vessel. From the neutralizing vessel the flue gas flows to the fire box of a heater.

The Rock Island unit is composed of a 4-ft. diameter vessel 17 ft. long and will take a charge of approximately 30 bbl. of spent caustic. At Rock Island three types of spent-caustic solutions have been neutralized. A typical analysis of two of these caustic materials is included in Table 5. The third solution is a 50-50 mixture of the two listed in Table 5. The Rock Island unit is not equipped with a flow meter and the flue-gas rate is not known.

When caustic from treatment of catalytic gasoline is charged, neutralization and complete evaporation of acid oils requires about 72 hours. The bulk of the time is used in evaporating the acid oils. A slightly different design from that shown is desirable when the spent caustic contains a high concentration of acid oils. Perhaps a design such as the Aurora unit is more desirable since the acid-oil layer can be withdrawn from the system with greater facility. The sulfide

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"Self-Seald" MEANS ... that in addition to a full-port lubricant seal, the wedge action of the plug under line pressure forces the surfaces of the plug outward, and constantly presses against the seating surfaces of the body, keeping them always in intimate contact. The valve automatically adjusts itself ... thus assuring extra long life, maximum leakless service, and lubricant economy.

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content is completely eliminated in about 24 hours.

The second type of caustic is caustic resulting from the treatment of straightrun gasoline and is composed principally of sodium hydrogen sulfide and sodium sulfide. It takes approximately 24 hours to neutralize a batch of this material since there is no acid oil to evaporate. A 50-50 mixture of caustic from the catalytic gasoline treaters and from the straightrun gasoline treater requires about 36 hours from neutralization and evaporation of acid oils—about half the time required when the straight catalytic gasoline caustic is charged. The reduced time probably results from the fact that sodium hydrogen sulfide will liberate acid oils and that evaporation of acid oils can take place from the beginning of the run, whereas it takes some time before there is sufficient carbon dioxide absorbed to liberate acid oil.

Disposal of Spent Caustic

Operators of catalytic cracking units have a means of disposing of spent caustic solution. For those refiners who do not have catalytic cracking units, a fan might be used to transport the flue gas through a neutralizing system. Induced-draft fans capable of handling hot flue gas are available. Such fans can put up sufficient pressure to get the flue gas through a neutralizer of the type shown in Fig. 3, and into the furnace setting, but large cross-section duct work would be necessary to keep line-pressure drop reasonably low.

Another means that might be employed at greater expense for equipment to utilize stack gas might be the scheme proposed by E. P. Kropp in his paper which was presented at the recent Cleveland meeting of the A.P.I. This equipment involved passing flue gas through two large vertical chambers connected in series. These vertical chambers were equipped with sprays for atomizing the fluid so as to get contact with the gas passing through the vessels. In adapting this for neutralizing caustic, the sprays would have to be made of a material resistant to corrosion by hot caustic.

Summarizing, there are three caustic neutralizers in use employing flue gas from a catalytic cracking unit. These neutralizers produce a finished caustic which can be discharged in the one case through a city sewer system and into the Detroit River, and in another case into a small stream that has as its principal source the waste water from a medium-sized refinery. It appears to be perfectly feasible to use a fan of the induced-draft type to blow hot flue gas through a caustic neutralizer. The time involved for neutralization, when a blower is used to transport the flue gas, may be longer due to the fact that the pressure on the system will be considerably lower and the rate of absorption of the carbon dioxide will be lower.

A neutralizer that must handle a spent caustic solution containing a large quantity of acid oils should be equipped with some means of skimming the liberated acid oils so that excessive evaporation times need not be used. Excessive evaporation times offer no objection if the neutralizing vessel can handle batches of caustic large enough to keep ahead of the accumulation of spent caustic.

Acknowledgment

The assistance of various associates of Universal Oil Products Co., C. O. Anderson of Rock Island Refining Co., and J. M. Lawson of Globe Oil & Refining Co., is gratefully acknowledged.

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3. J. C. Albright, Pet. Engr., April 1949.
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5. E. P. Kropp, Scrubbing Devices for Air Pollution Control. presented at fifteenth midyear meeting of the A.P.I., Division of Refining, Cleveland, May 3, 1950.

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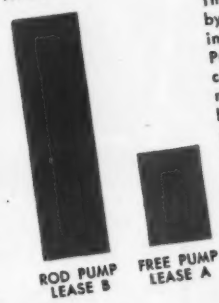
CASE HISTORY

Comparative Production Costs Rod Pump and Free Pump



The figures submitted here were compiled by an operator with two neighboring leases in the Scholem Alechem field, Oklahoma. Producing conditions on both leases are comparable. On Lease B, six wells are being rod pumped. On Lease A, sixteen wells are being Free Pumped. All costs—pumping, pump pulling, paraffin removal, maintenance, and power—were carefully tabulated for a period of six months. The results are shown in the accompanying bar chart and table. The Free Pump wells not only produced more oil—1760 bbls. per month per well compared with 955 bbls.—but their total operating cost per well was lower.

OPERATING COST DATA

	Lease A Free Pumps	Lease B Rod Pumps
Number of wells	16	6
Period covered	6 mos.	6 mos.
Average B/W/M	1760 bbls.	955 bbls.
Cost/W/M	$78.00	$111.00
Total Cost/B	4.5¢	11.6¢

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Water-pressure plant at Deep Rock Oil Corp. being inspected by some of the 300 recent visitors, of the Kansas-Oklahoma Water-Flood Operators group. Injection water (2,150 bbl. per day) moves out to field wells at 700 psi.

Deep Rock Water Floods 304 Acres

—Depth 800 Ft., Oil Recovery Estimated At From 3,500 to 6,950 Bbl. Per Acre

by J. C. Joers,* P. Grandone,* and D. B. Taliaferro*

ALTHOUGH Deep Rock Oil Corp.'s water-flooding project northwest of Chanute, Kans., in 16, 17, 18, and 19 26s-18e, Allen County, includes one of the oldest water-flooding operations in the state, the project has been under the present ownership for only about a year. Water flooding was started by Matson, Towne & Melvin in April 1938 on 12 acres of the Berry and Burtiss leases in Section 18 on the western end of the present project (Fig. 1). The project was developed gradually, and at the end of 1946 it covered 104 acres.

Fourteen acres on the Stewart and McKinley leases in Sections 16 and 17, near the eastern limits of the present development, were placed under flood in October 1941 by Williams Producing Co. The flood was extended to cover 56 acres by 1946 when the project was purchased by Matson, Towne & Melvin. The combined projects were extended to include approximately 200 acres by November 1947, when the properties were sold to Sloan & Zook. This new operator developed about 20 additional acres

*Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville. Report prepared as part of annual inspection tour of properties, Kansas-Oklahoma Water - Flood Operators Group.

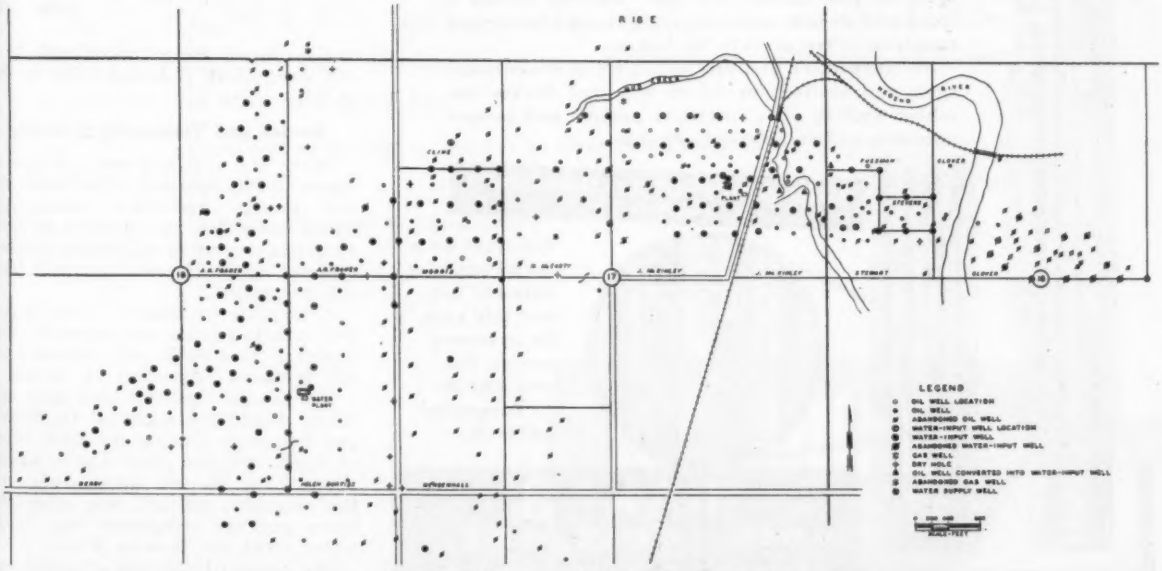

Fig. 1—Map of Deep Rock Oil Corp. water-flooding project.

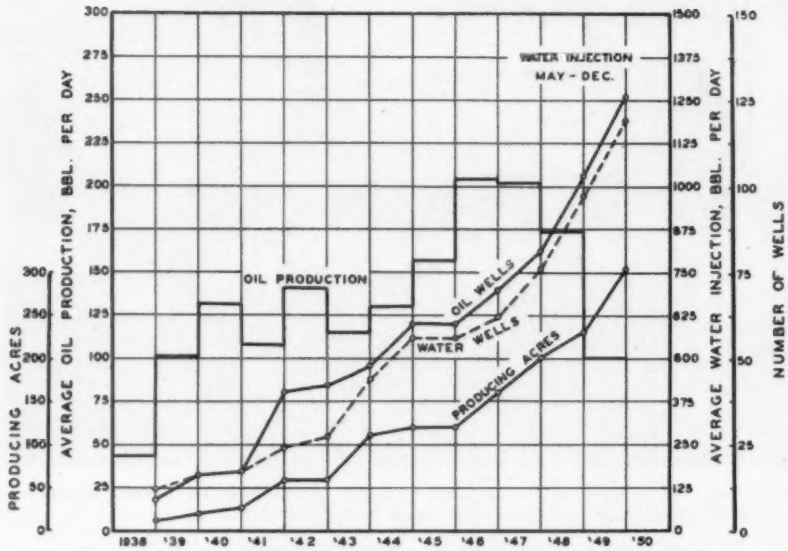

Fig. 2—Production history of Deep Rock Oil Corp. water-flooding project.

on the west group of leases and 10 on the east leases by July 1, 1948, when the entire project was sold to Deep Rock Oil Corp. During 1949, the properties were developed at an accelerated rate, and at the end of the year a total of 304 acres was being flooded.

The formation being flooded consists of two stringers of Bartlesville sandstone, the upper, extending north from the Wadley lease in Section 19 (Fig. 1) across the Burtiss and Fraker leases, and the lower, (the more extensive) running from the Berry lease in Section 18 across the entire project to the McKinley and Stewart leases of the former flood of Williams Producing Co. in Sections 17 and 16, respectively.

The productive sandstone of the north-south stringer (including the Matson, Towne & Melvin development) is at a depth of about 800 ft. and has a thickness of 35 to 60 ft. On the east end of the project (Williams Producing Co. development) the depth of the productive section is about 810 ft. and the thickness averages about 17 ft. A nonproductive upper sand on the east end of the development is separated from the productive stratum by 26 ft. of shale.

Early History of Leases

Initial development was started on the Burtiss and Wadley leases by drilling four wells during 1914 and 1915, but most of the original drilling occurred during 1919 and 1920. Vacuum was the only stimulative method of production applied to the leases before water flooding, and this method was continued for only 6 months in 1923, because the results were not favorable.

When the initial water-flooding developments were started, the rate of oil production had decreased to 18 bbl. per day from 9 wells on the Matson, Towne & Melvin leases, and to 6 bbl. per day on the Williams Producing Co. leases.

Core Analyses

Average results of the analyses of several Bartlesville sand cores from both ends of the project are as follows:

	West side	East side
Net sand thickness, ft.	38	17
Permeability, md.	126	
Porosity, per cent	21	18
Oil saturation, per cent	46	30
Water saturation, per cent	32	42
Resid. oil sat. (flood-pot)	33	28
Total oil content, bbl. per acre	28,770	15,700
Oil recovery (flood-pot) bbl. per acre	8,400	4,540
Oil recovery (estimated) bbl. per acre	6,950	3,500

Gravity of the oil produced from the west group of leases is 28° to 29° A.P.I.

Source and Treatment of Water

When the east and west groups of leases were operated separately by the former operators, Mississippi limestone water was injected without chemical treatment or filtering (closed system) on the Matson, Towne & Melvin properties.

A mixture of Neosho River water and returned brine was injected after chemical treatment and filtering on the Williams Producing Co. leases.

The present operator uses only one plant, employing chemical treatment and filtration. During the first week of April 1950, the plant was handling about 2,150 bbl. of water daily. Of this quantity, 450 bbl. was produced brine and the remainder was fresh water from the Neosho River.

The present treatment of water va-

(Continued on page 97)

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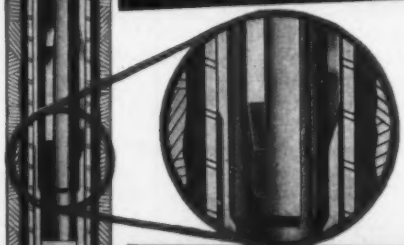

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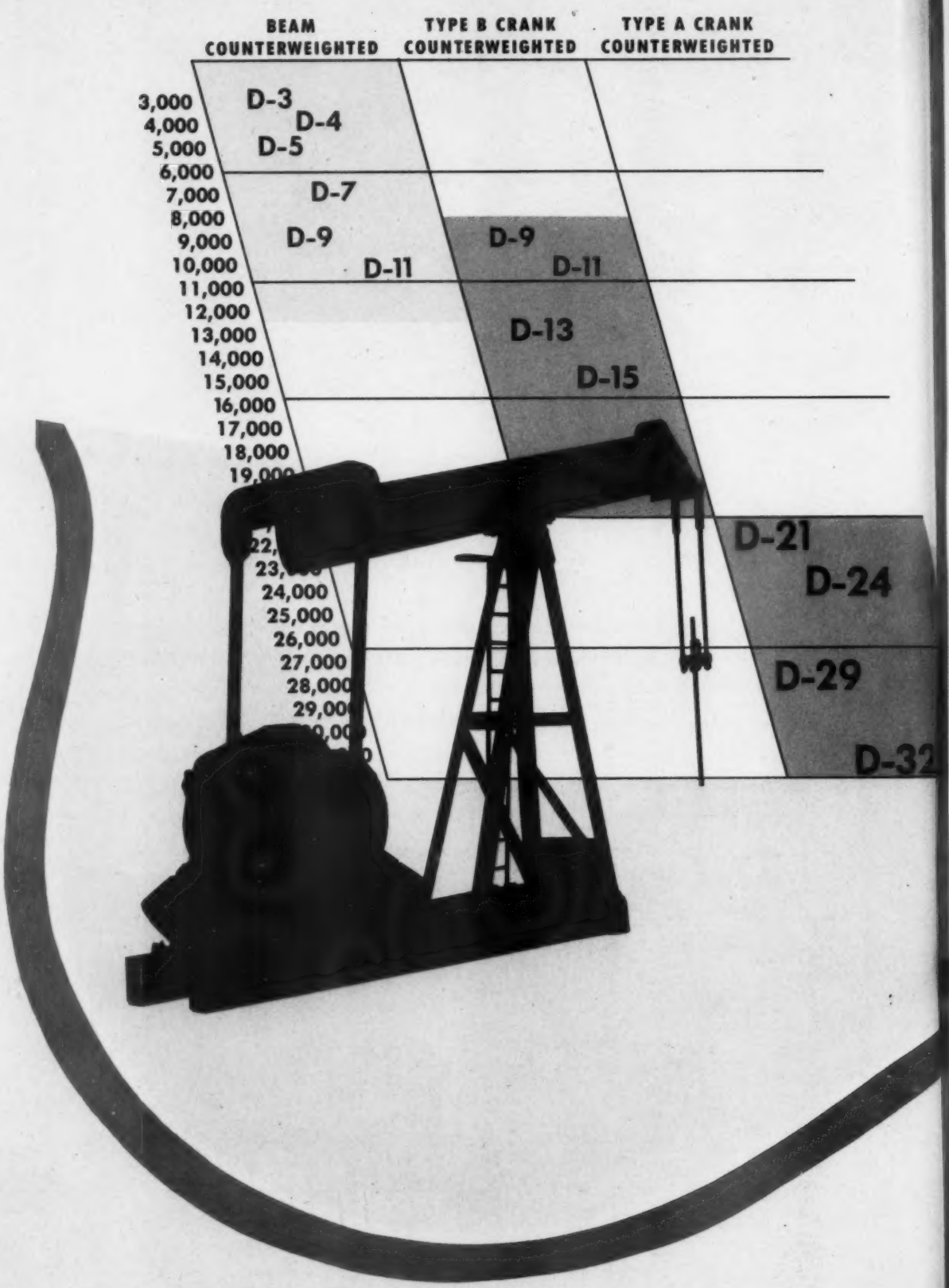
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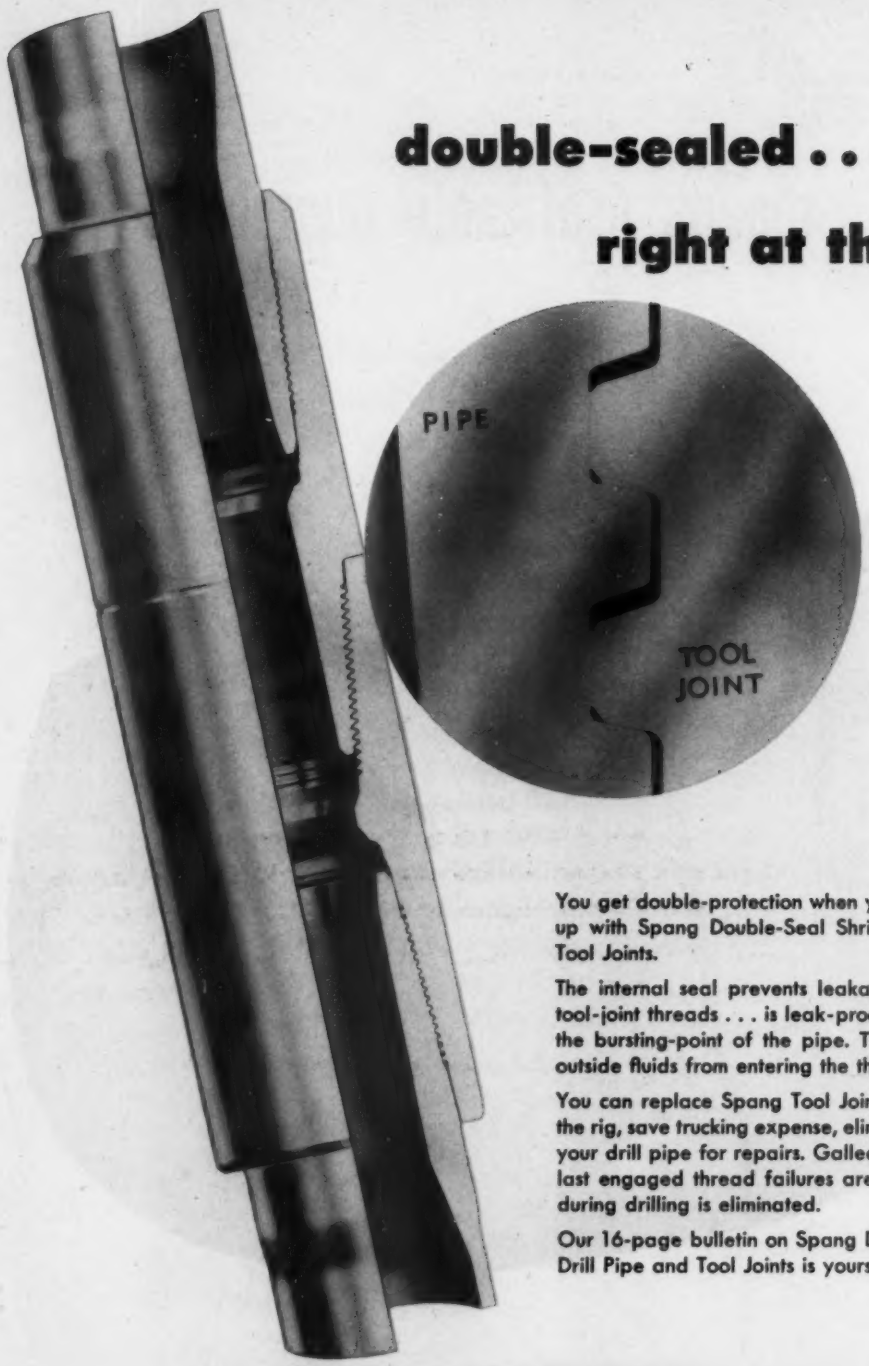

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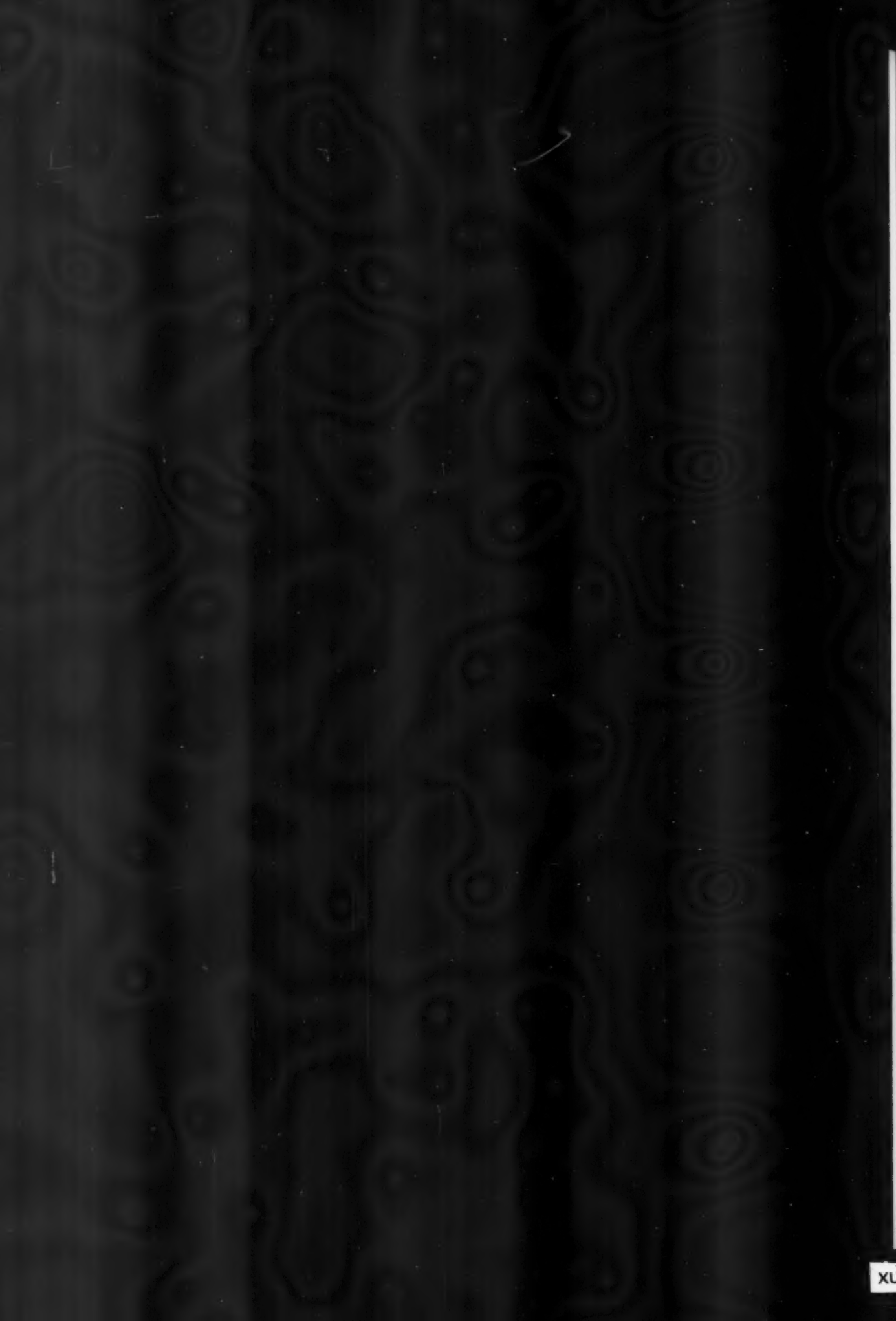

ries little from the usual pattern. Water from the river is pumped into an earthen settling pond, where it is mixed with produced water from the oil-tank batteries. The mixed water then flows by gravity through the treating house, where chemicals are added by a mechanical feeder, and through a flume to a second earthen pond for chemical reacting and settling.

From the treating pond the water is pumped into a standpipe 37 ft. high, made of 16-in. pipe, which is designed to maintain a constant head of water on the filter. This hydrostatic head causes the water to flow through pressure filters into a 500-bbl. clear-water tank.

Two pressure filters are provided, one filled with sand on rock and the other with Anthrafilt on rock. Only the sand-filled unit is being used continuously. Water from the clear tank is being injected at a plant pressure of 700 psi. by means of one triplex pump driven by a 50-hp. gas engine.

During April 1950 the chemical treatment for a daily throughput of 2,150 bbl. of water consisted of 100 lb. of alum, 12 lb. of ammonium sulfate, 12 lb. of copper sulfate, and 10 to 12 lb. of HTH (chlorine liberating agent). Both copper sulfate and HTH are algaecides. During this period the pH of the raw river water was 8.2 and the produced brine 7.7. An attempt is made to hold the pH of the treated water at 7.5.

There had been evidence of corrosion of pipe and subsequent clogging of input wells by the treated water, but this condition was remedied by the installation of cement-lined pipe for the water distribution system. Cement-lined tubing also is used in all wells.

Water-Flood Development and Operation

Matson, Towne & Melvin began the original 12-acre flood development on the Fraker, Burtiss, and Berry leases (Fig. 1) early in 1938, drilling like wells about 200 ft. apart. However, there was no regular pattern of wells, because many of the existing oil wells were included in the project. All wells were drilled through the sand and shot with liquid nitroglycerin. Two quarts per foot of sand were used in the producing wells and 1½ qt. per foot in the injection wells. As the wells were completed for pumping, they were cased with about 750 ft. of 6½ or 6⅝-in. casing; input wells were equipped with 1½-in. tubing set on a packer on top of the sand and cemented.

Williams Producing Co. started water flooding the Stewart and McKinley leases during October 1941. They also used an irregular flooding pattern, because existing oil wells were used. Producing wells were cased with 630 ft. of 6¼ or 4⅞-in. casing to accommodate the 2-in. pumping string; input wells were equipped with 2-in. tubing set on a packer at the top of the sand (810 ft.) and cemented. All wells on these leases were shot with 1½ qt. of nitroglycerin per foot of sand.

The present operator has converted the entire project from a pumping to a flowing operation except for a few wells. All new wells, therefore, whether for injection or production, are completed alike. The wells are shot selectively with 2½ to 4½ qt. of nitroglycerin per foot of sand, starting at a depth of 5 ft. below the packer point. They are equipped with 2-in. cement-lined tubing set on a packer at the top of the sand and cemented.

Cased to Top of Sand

During drilling operations, the wells are cased to the top of the sand, but the casing is pulled after installing the 2-in. tubing. One to three joints of 6¼-in. surface pipe are left mudded in place. The drilling of producing wells is delayed until the sand is filled by the injection of water into surrounding input wells. This makes it necessary to reduce the formation pressure temporarily while drilling in new producing wells by shutting in local input wells.

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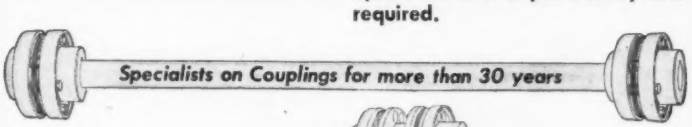

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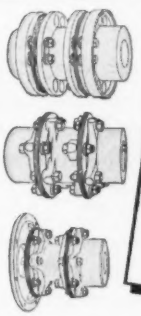

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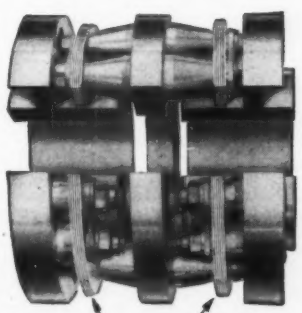

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operator is on a five-spot pattern with like wells spaced 330 ft. apart. No old wells now are being used, except a few that happened to be located properly in the pattern for producing wells. At the end of 1949, there were 304 acres under flood on which there were 119 input wells and 126 oil wells. Of the producing wells, 19 were being pumped and 107 were flowing.

Deep Rock injects water into each well at a daily rate of 2.5 bbl. per foot of sand (about 1 bbl. per acre-foot), but frequently the maintenance of this rate depends on the availability of an adequate quantity of water. The fill-up time has been 3 to 6 months at this injection rate. All input wells are equipped with meters, which are read daily for proper control of injected water, whereas the rate of water production is measured weekly at the water separators on the leases. The rate of oil and water production from individual wells is measured periodically with a 55-gal. test tank.

When input wells show indications of increasing back pressure, the sand face is washed with water by means of an air-lift tube run through the 2-in. tubing. In more extreme cases the sand face is washed with hydrochloric acid through a separate wash tube. The acid is allowed to stand overnight in the well and then the excess either is dispersed into the formation with water pressure or is displaced from the well through the same wash string.

Use of the wash string prevents contact of the acid with the cement lining. Acid treatment of input wells on the Morris lease (40 acres) has increased the water-input rate of these wells 35 per cent, and there is evidence of an increase in oil production. A similar treatment of wells on the McKinley lease was completed too recently for evaluation of results.

Results of Flooding

Production records show that to the end of 1947 the first two operators had recovered 486,500 bbl. of oil from about 200 acres under flood, or 2,432 bbl. per acre. By the end of 1949, the entire project had produced 586,560 bbl. of oil from a total development of 304 acres, or an average recovery of about 1,930 bbl. of oil per acre. The decrease in recovery on a per acre basis is attributable to the large percentage of the flood that has been developed so recently that it has not had time to reach its peak of production much less give any reliable indication of the ultimate recovery to be obtained.

The two original projects, covering about 200 acres on five leases, had produced nearly 2,850 bbl. of oil per acre by the end of 1949. After 11 years of operation, the Burtiss lease still is producing about 32 per cent as much oil as it did in the year (1942) of peak flood production. On the other hand, at the end of 11 years the Berry lease was producing only about 3.5 per cent as much as it did during its peak production year (1940).

Fig. 2 shows graphically the average daily rate of oil production each year. The rate of development of the project is reflected by curves showing the areal extent of the flood and the number of injection and producing wells in use. The average oil-producing rate during 1949 was 100 bbl. per day, although the rate at the end of the year was 125 bbl. per day. The year of peak production was 1946 when the average rate was 204 bbl. of oil daily.

Only incomplete records of the rate and amount of water injected by the former operators are available. An average of 1,370 bbl. of water per day was injected during the last 8 months of 1949, but at the end of the year 1,687 bbl. of water per day was being injected into 119 input wells. At the end of 1949, 13.5 bbl. of water was being injected per barrel of oil produced. Six barrels of water was being produced with each barrel of oil. The differences in the injected water-oil produced ratio and the produced water-oil ratio give an indication of the amount of water being utilized to fill up the voids in the sand body.

CORROSION PREVENTION with typical Chromate Applications

DRILLING — Introduce sufficient Sodium Bichromate into the drilling mud to maintain a concentration of 2000 to 3000 ppm in the water.

GAS CONDENSATE WELLS — Inject continuously into the annulus between the tubing and casing a Sodium Bichromate solution at a constant rate to maintain 50 to 100 ppm in the water which separates at the well head.

GASOLINE PIPE LINES — Inject Sodium Chromate solution into the suction side of the station pump at a rate to maintain a positive test for hexavalent chromium at the discharge end of the pipe line; or at the next pump station where chromate solution is injected, usually 50 to 200 miles.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Cracking Low-Gravity Stocks

The yield equation in Petroleum Refinery Engineering gives too-large cracking yields for low-gravity feedstocks. How can we estimate yields for such materials?—P. M. C.

Few yield data are available on the cracking of low-gravity stocks. Meager data from the literature are shown in Table 1 and Fig. 1. Equation 88 of the Third Edition of Petroleum Refinery Engineering (McGraw-Hill Book Co.) is also shown on Fig. 2. It obviously cannot be applied to low-gravity feed stocks but it lies nicely among the lines for 20° and 25° A.P.I. stocks. The older and simpler equation:

$$\text{Yield} = 25 + 1.5\,(S - T)$$

in which S and T are the A.P.I. gravity of the feed and the cracked fuel oil, even more accurately represents the average yields from charge stocks at 15°-30° A.P.I.

It must be noted that the accuracy is not good (see Fig. 2). Most of the experimental data are not in error by more than plus or minus 6 per cent but one point is in error by 14 per cent.

A most important consideration is the gravity of cracked fuel that can be produced without exceeding the allowable viscosity, pour point or b.s. and w. content. Low-gravity fuel oils cannot be produced from highly paraffinic charge stocks. They have high pour points and b.s. and w. is precipitated when they are cut back with distillate to reduce the viscosity. Naphthenic charge stocks produce fuel oils that are much more compatible with cut-back distillate. Most generally, the situation seems to be as shown in Table 2. Obviously, the degree or extent of cracking is related to the gravity of fuel oil that can be produced.

The relation of yield to the viscosity of the fuel oil was discussed on this page in the issue of June 29.

TABLE 2—LOWEST GRAVITIES OF CRACKED FUEL OILS AS A FUNCTION OF THE CHARACTERIZATION FACTOR OF RESIDUAL CHARGE STOCKS

Characterization factor	A.P.I. gravities — Regular cracking	A.P.I. gravities — Using reaction chambers or severe vis. breaking
12.0	10	7
11.8	8	6
11.6	7	5
11.4	5	3
11.2	4	1
11.0	3	0

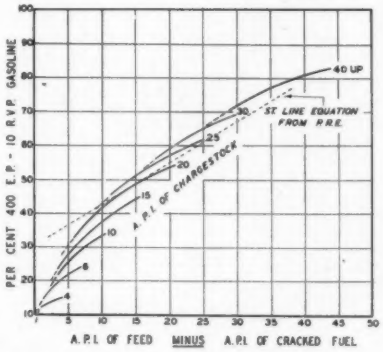


Fig. 2—Approximate thermal cracking yields as a function of the capacity of the feed and fuel oil.

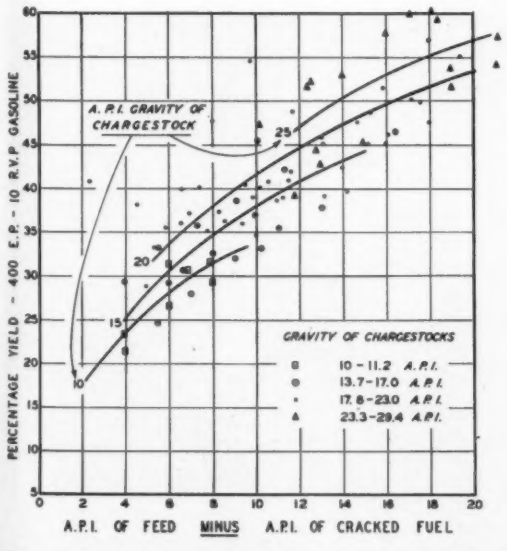

PERCENTAGE YIELD - 400 E.P. - 10 R.V.P. GASOLINE
A.P.I. OF FEED MINUS A.P.I. OF CRACKED FUEL
A.P.I. GRAVITY OF CHARGESTOCK
GRAVITY OF CHARGESTOCKS
10 - 11.2 A.P.I.
13.7 - 17.0 A.P.I.
17.8 - 23.0 A.P.I.
23.3 - 29.4 A.P.I.

Fig. 1—Check on accuracy of thermal cracking yields (see Table 1.)

References

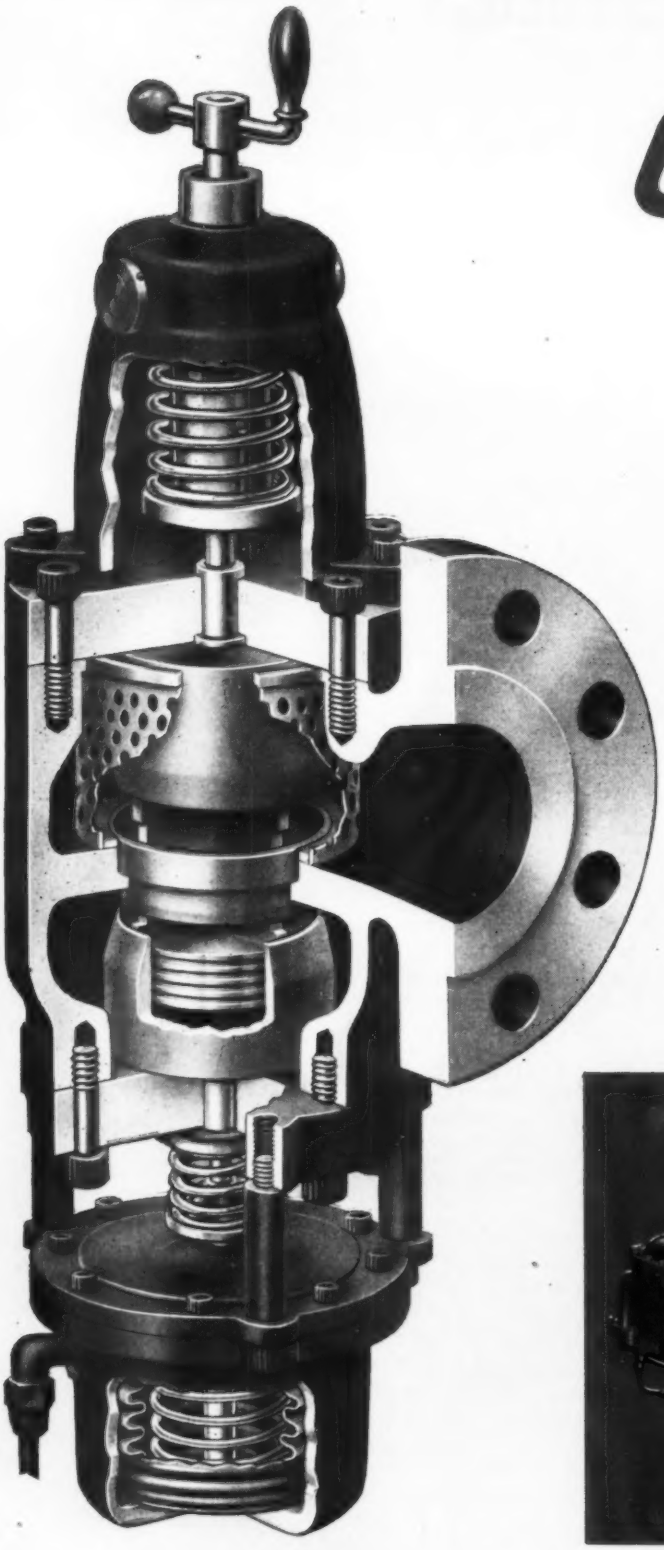
1. Author's personal files.
2. Armistead, George—Modern Refining Processes, Ch. XVIII, The Oil and Gas Journal, May 17, 1947.
3. Wagner, C. R.—Cracking Technology No. 5, The Oil and Gas Journal, October 7, 1943.

(Continued on page 105)

TABLE 1—THERMAL CRACKING YIELD DATA

Charge	Fuel oil	Diff. in °A.P.I.	Yield per cent	Ref.
*13.7	9.7	4.0	29.4	1
*13.7	2.4	11.3	42.3	1
‡10.0	2.0	8.0	29.4	2
†10.0	4.0	6.0	26.7	2
†10.0	6.0	4.0	21.5	2
15.0	2.0	13.0	37.8	2
15.0	4.0	11.0	35.5	2
15.0	6.0	9.0	32.0	2
15.0	8.0	7.0	28.0	2
20.0	2.0	18.0	47.5	2
20.0	4.0	16.0	45.3	2
20.0	6.0	14.0	42.5	2
20.0	10.0	10.0	34.6	2
25.0	2.0	23.0	56.2	2
25.0	4.0	21.0	54.0	2
25.0	6.0	19.0	51.6	2
25.0	10.0	15.0	45.2	2
‡18.8	18.5	0.3	13.0	1
§22.0	4.0	18.0	57.0	1
§22.0	10.8	11.2	38.7	1
§22.0	6.8	15.2	45.2	1
18.0	12.0	6.0	27.0	1
‖19.0	12.1	6.9	37.3	3
‖19.0	13.1	5.9	35.6	3
‖19.0	13.6	5.4	33.4	3
‖19.0	12.4	6.6	36.2	3
‖19.0	14.4	4.6	38.2	3
16.5	9.3	7.3	35.8	4
16.5	7.4	9.1	38.6	4
18.9	10.6	8.3	37.4	5
18.3	11.9	6.4	34.6	5
16.9	11.4	5.5	33.25	6
18.9	8.3	10.6	40.9	7
21.1	6.9	21.3	46.3	7
25.6	1.8	23.8	61.7	7
¶29.4	11.3	18.1	60.3	8
¶29.4	12.3	17.1	59.9	8
21.4	14.0	7.4	40.2	9
21.4	14.8	6.6	40.0	9
22.8	3.4	19.4	55.1	10
15.6	5.5	10.1	45.6	10
22.1	6.0	16.1	46.2	11
21.3	9.6	11.7	48.9	11
22.5	14.5	8.0	47.7	11
22.3	6.4	15.9	51.5	11
18.7	10.9	7.8	35.1	12
18.7	1.1	17.6	49.8	12
24.6	10.6	14.0	53.0	13
24.6	6.1	18.5	59.4	13
20.4	10.9	9.5	40.5	13
19.1	14.1	5.0	28.9	13
19.1	10.5	8.6	36.3	13
11.2	3.3	7.9	31.8	13
23.8	13.6	10.2	47.3	13
23.8	11.4	12.4	51.6	13
23.8	11.2	12.6	52.2	13
23.8	7.8	16.0	57.7	13
17.0	6.8	10.2	33.1	14
21.1	7.9	13.2	39.2	15
21.1	6.9	14.2	39.7	15
16.9	11.4	5.5	24.7	17
16.9	10.2	6.7	30.8	17
16.9	0.5	16.4	46.5	17
23.3	11.5	11.8	39.2	17
23.3	10.5	12.8	44.5	17
20.9	6.2	14.7	47.6	18
18.1	7.9	10.2	40.2	18
19.0	9.6	9.4	36.0	19
21.1	8.0	13.1	45.9	20
18.4	8.6	9.8	54.6	20
18.6	7.0	11.6	42.0	1
19.8	8.3	11.5	41.0	1
17.8	8.9	8.9	39.0	1
17.9	6.7	11.2	39.0	1
17.9	4.8	13.1	45.2	1
17.9	2.6	15.3	48.8	1
17.9	0.7	17.2	50.2	1
10.0	2.0	18.0	39.5	21
10.0	4.0	6.0	31.5	21
10.0	6.0	4.0	23.5	21
15.0	5.0	10.0	37.0	21
15.0	7.0	8.0	32.6	21
15.0	9.0	6.0	29.3	21
23.0	2.0	21.0	57.3	21
23.0	4.0	19.0	53.7	21
23.0	10.0	13.0	42.9	21

*Charge viscosity 150 U. S. S. at 350° F. †An extrapolation. ‡Charge viscosity 193 Furol at 122° F. §Charge viscosity 87 Furol at 122° F. ‖Yields from recycle and gas oil est. ¶Entire crude cracked—7.5 per cent naphtha.



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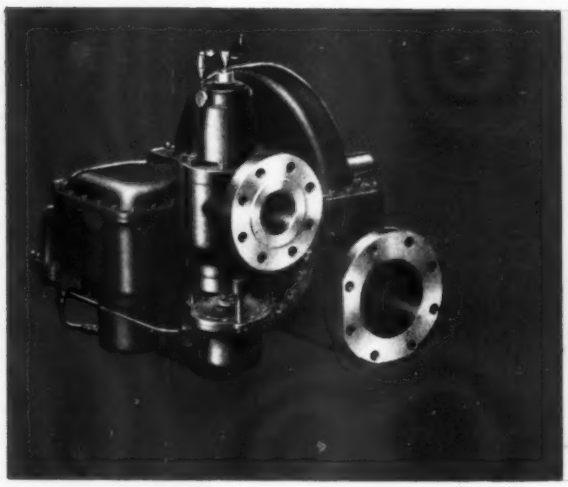

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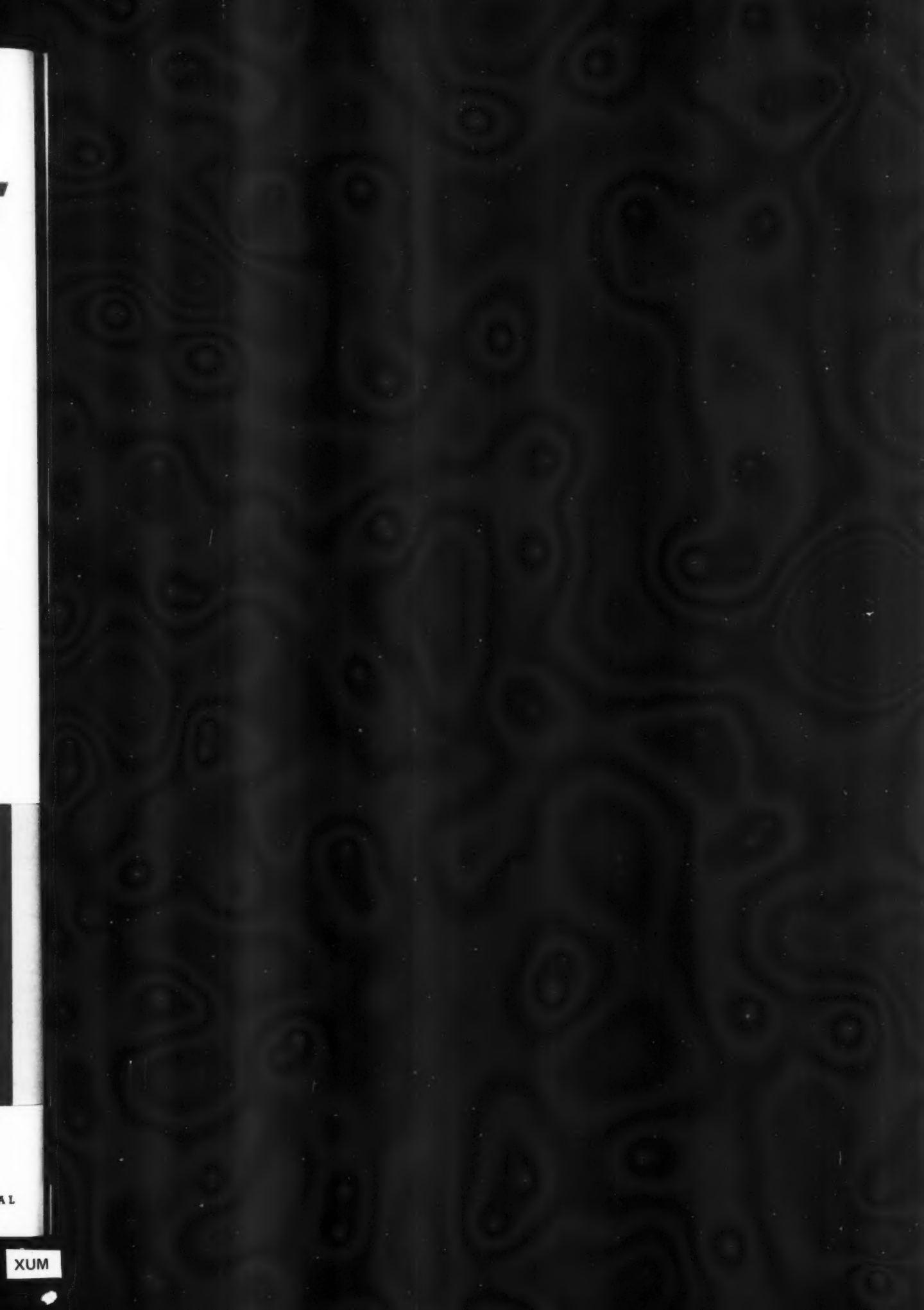

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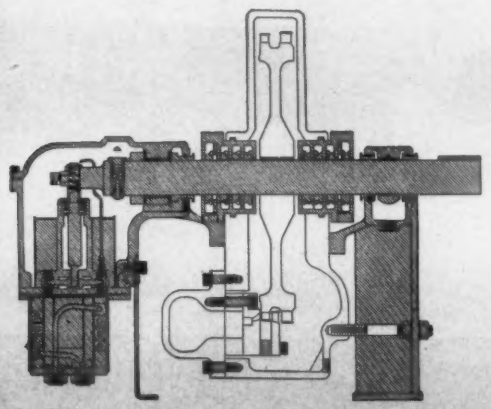

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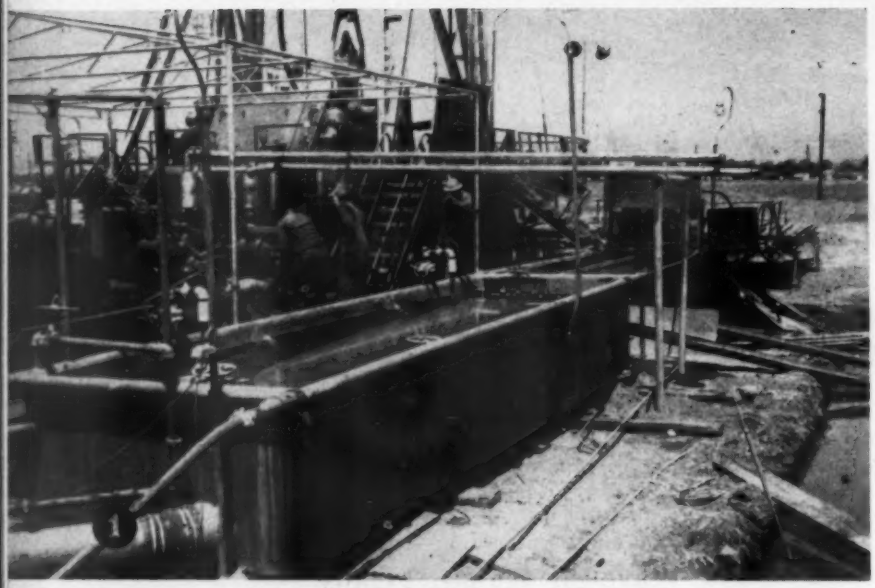


1. CLOSEUP.—This shows No. 1 steel mud-settling tank, equipped with slide-valve outlets at bottom of side. Arrangement permits rapid dumping of mud if necessary, to clean out tank quickly.

Revised Mud System Features Unusual Design Innovations

THE revised mud system on a rotary rig of Fred M. Manning, Inc., (currently operated by Coastal Drilling Co. in East Los Angeles oil field) incorporates a number of interesting engineering features. The drilling fluid is circulated and conditioned in steel tanks, and around the top of each tank is welded a steel piping "service system" through which the driling fluid can be circulated.

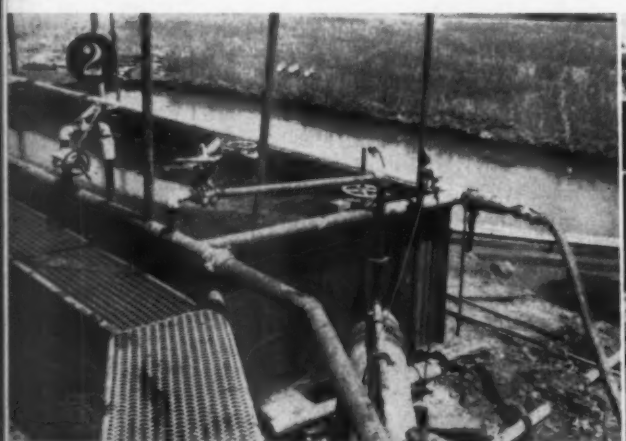
The revamped tanks were cut down to a narrower size from original vessels, for greater convenience for moving by truck. The 4-in. pipe attached to each tank provides a stiffener which is much more resistant to damage than angle-iron reinforcing normally used for that purpose.

Flow of drilling mud after it is discharged from the well is first into a shaker box where fluid level is maintained high enough to allow flow over the screens. The level can be changed quickly by progressive steps to bypass the shakers entirely. This is accomplished with a large, short-coupled swing pipe which can be locked in the desired position by dropping a lug into a semicircular notched ring attached to the swing pipe. The range of swing is 90° of arc.

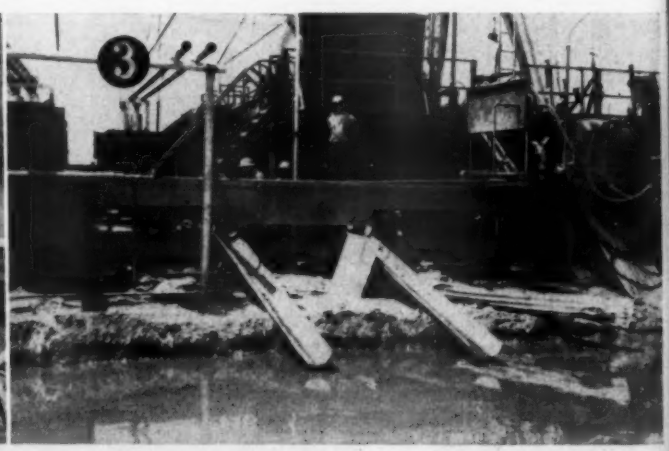
Two Outlets Provided

Two outlets are provided for the drilling mud to pass from the shaker pit, one of which controls the flow at a high level through a flume leading to the second tank in the series. The flume has an enlarged section, extending downward in the middle and with its length approximately one-half that of the flume. Any heavy, easily precipitated particles which may have passed through the separating screens of the shaker (fine-grained sand for example) separate from the mud in the enlarged section of the flume. Dump gates in the floor of this section of the flume open into short troughs. Longer auxiliary troughs are attached to the shorter troughs to carry the separated particles into the shale pit for final disposal.

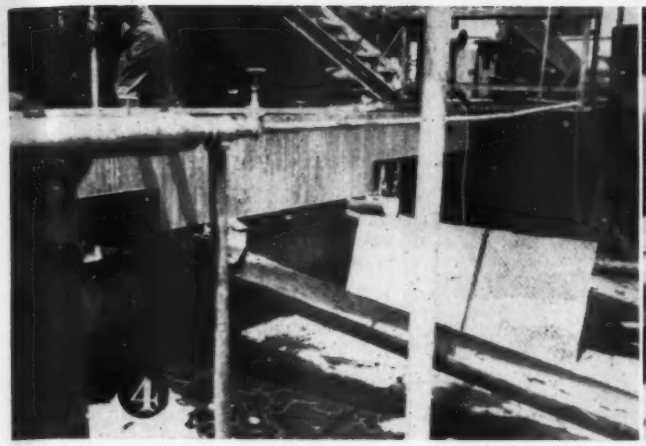
Under certain drilling conditions when full flow of mud may be run from the shaker pit directly to the second mud tank, a large pipe is connected from the end of the shaker pit to the inlet end of the second tank. This pipe is attached to both tanks by inserting its ends into ferrules and locking the joints into waterproof canvas sleeves. These sleeves are clamped to the ferrules and to the pipe with steel binding straps similar to those used for crates.



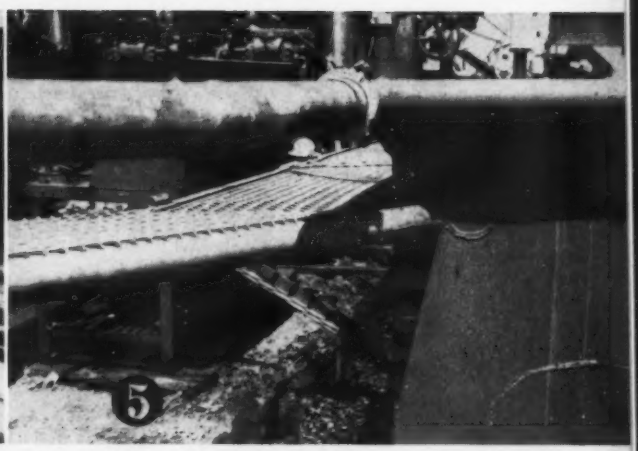
2. CONNECTIONS.—View of No. 1 settling tank. The connections of pipe and hose carry mud fluid to desired points. The large pipe, lower, connects first basin to second vessel; flexible, banded fittings are used which may be attached and torn down easily.



3. FLUME AND PIPE LINE.—These connect top and bottom of shaker pit (right) with first settling tank (left). Quick dump connections in the central expanded section of flume permit unloading, via two troughs, large particles precipitated from drilling fluid.



4. ENLARGED SECTION OF FLUME.—Flume connects shaker pit with first settling basin. Bottom outlets discharge settlings into troughs, which lead material into shale pit.



5. QUICK COUPLING.—Method of attaching pipe line to side pipe-line member of mud tanks. Note arrangement used in supporting elevated walkway alongside the mud system.

The method of making connections simplifies rigging up.

The second tank in the setting, like the others, is placed on timber mats to eliminate ground contact and for ease in leveling. The side rails surrounding this tank are also made of 4-in. pipe which carries the mud under pressure to any point in the system. Lines lead from the mud-distribution manifold to these pipe side rails to supply the fluid under operating pressure. Connections are made at frequent intervals to attach pipe and fittings to submerged mud-agitation nozzles used to create turbulence in the tanks. Large slide valves also are attached to the side walls of this tank so the contents may be quickly dumped after completing a well, or when an immediate change of mud is needed.

Two Fittings on Railing

The discharge from the second to the third tank is similar in design to the one connecting the base of the shaker pit to the second vessel, and is attached with similar tie clamps. The 4-in. railing on this end of the second tank has two fittings, one on either corner, with one made up with unions for direct pipe transfer to the rail of the third vessel. The opposite corner on this end has fittings to connect a high-pressure transfer hose to conduct mud and/or water, as case may be, to other operations where fluid under pressure is required.

The third tank in the series is made with two compartments, the first of which is directly below the mud-mixing device so that jels and other additives can be dumped directly into the mud flowing through the system. Grating is used as a floor above the first compartment so men can work in safety when handling bags of material for mud conditioning.

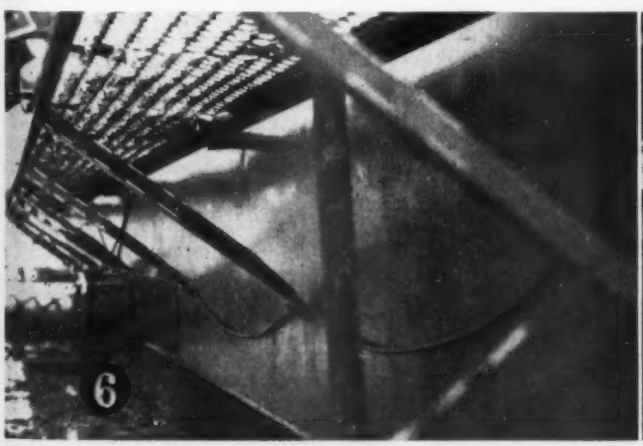
Shear-pin safety valves on the discharge of the mud pumps are fitted with disposal lines leading to the mud tanks, where risers are placed with the outlet ends submerged in the drilling fluid. This arrangement is to prevent spraying of high-pressure mud over operating equipment and surrounding areas.

Walkways and Supports

Access to various fittings and control valves above the top of the mud tanks, too high to be operated from ground level, is provided for by a continuous grated walkway along the entire tank system.

Supports are provided with diagonal angle-iron connections from the outer rim of the walk to a point near the floor of the tanks where pins and lugs are employed to carry the weight of the walk and the men working on the mud system. Removing pins and braces permits the walkway to be removed entirely when shipping long distances, or simply folded down against the sides of the tanks for skidding to other location on the lease.

Provisions are always made when rigging up the mud system to provide access for trucks so that the drilling mud can be trucked away for disposal, or stored elsewhere for future use.



6. WALKWAY DETAIL.—The supported walkway at sides of steel mud vessels may be quickly attached or removed.

7. DUMP SWING.—This swing pipe on steel shaker pit box, controls depth of mud fluid in the inlet box.

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Systematic Development Program Followed

(Continued from page 73)

customary to bottom the hole from 16 to 18 ft. above the known water level in the D-3 zone. In the two wells which failed to find D-3 above the water level, casing was run below the base of the D-2. This permitted exposure of the D-2 through casing perforations without the necessity of drilling the plug from the casing. Such completion practice provides an adequate plug to protect the D-2 from fluids in the section below.

The Alberta Conservation Board has approved the use of two wells in Stettler for dual completion on an experimental basis. One well, 8 C.P.R.-Havig, has been dually completed and the performance of the well is being observed very carefully. Casing, 7-in. o.d., was set in the normal manner on top of the D-3 zone with perforations opposite the D-2 zone. Production-type packers were set above and below the D-2 perforations, with a changeover flow tube in the upper packer.

The change or crossover routes the D-3 production, which enters the tubing in the open hole below the casing shoe, to the annulus between 3½-in. o.d. tubing and the 7-in. casing. The D-2 production enters the annular space between tubing and casing between the two packers, crosses over and enters the tubing, and reaches the surface through this conduit.

During the process of completion, the production was commingled into both tubing and annulus until the well cleaned up, after which time a separation tool was run on wire line which then confined each of the formation fluids to its proper channel.

North Cowden Field

(Continued from page 79)

propanizer bottoms are exchanged with the cold treated product and cooled to 95° F. with water. After treatment and heat exchange with treater feed, the stream is preheated to 213° F. before being admitted to the debutanizer.

The debutanizer also may be fed on any of three trays. The column is operated to produce 12 to 26-lb. R.v.p. natural gasoline as bottom product and mixed butanes as overhead. Design operating pressure when making 26-lb. gasoline is 117 psig. and reflux to feed ratio is 1.5 to 1.

Product treating.—The depropanizer bottom stream is contacted countercurrently with 10 per cent caustic solution, Fig. 4, which removes about 75 per cent of the mercaptans in the raw stream. The treated stream from the contactor flows through a horizontal settler and a sand filter for removal of entrained caustic.

Rich caustic solution from the bot-

tom of the contactor is heated by exchange with hot lean caustic before entering the caustic regenerator near the top. Mercaptans are stripped from the caustic and pass overhead with steam generated in the reboiler. Most of the overhead steam is condensed in air coolers and is returned to the regenerator as reflux. Approximately 10 per cent of the total stripping steam is vented with the mercaptans. Lean caustic after exchange is cooled to 95° F. before entering the contactor at a design circulation of about 13 g.p.m.

The propane product is contacted with a 10 per cent solution of caustic in a batch wash to remove traces of hydrogen sulfide. The propane and caustic are mixed in an orifice mixer and flow to a horizontal tank for separation. Propane passes overhead from the settler and through a sand filter before entering solid-desiccant dehydrators. Regeneration cycle on the driers is 36 hours and provisions have been made to regenerate with either residue gas or propane vapor.

Natural-gasoline product from the debutanizer is treated to doctor specification in solid-bed copper chloride treaters. Regeneration air is mixed continuously with the gasoline before it enters the bed. Provisions have been made to treat debutanizer feed in the event that butane product is appreciably contaminated with mercaptans.

Steam system.—Two 42,500-lb. per hour water-tube boilers generate saturated steam at 300 psi. High-pressure steam is used for stripping in the primary still and for heating in the residue gas and propane dehydration units and the remainder is expanded through steam-turbine pump drivers. Turbines exhaust into a 90-psi. system which supplies the rest of the process heating requirements. There are high and low-pressure clean condensate return systems and oily condensate is returned after filtration.

Makeup water is conditioned in a hot lime soda treater which is operated to remove silica as well as to soften the water. The top section of the treater vessel deaerates the entire boiler feed.

Other utilities. — Cooling water is furnished by a five-cell induced-draft tower designed to cool 17,000 g.p.m. from 96° to 77° F. Facilities for chlorinating and adding acid are provided and a cold lime treater is installed for treating cooling tower makeup.

The plant electrical load is carried by five gas-engine-driven 800-kw. 4,160-volt 3-phase generators. Generators have a separate closed jacket water system using air cooling.

Product storage and loading.—Storage provided includes three 12 by 120-ft. cylindrical propane tanks, four 10 by 98-ft. cylindrical butane tanks, and three 5,000-bbl. spheroids for gasoline. Most of the gasoline and some of the butane leave the plant by pipe line. There are also truck-loading facilities at the plant and a rail-loading rack south of Odessa, Tex.

Questions on Technology

(Continued from page 99)

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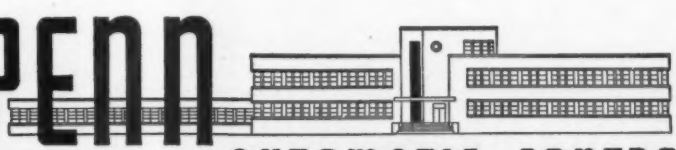

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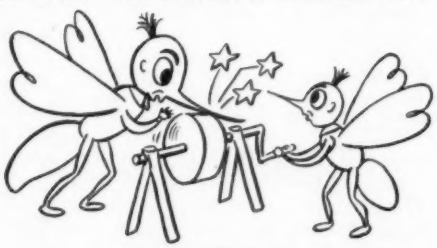

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OPERATING IDEAS

Crane for Handling Heavy Tools

SO that trucks hauling heavy tools can unload and take on cargo from either end of a material dock, Barnsdall Oil Co. has built a permanent hoist runway on its lease south of Coalinga Nose field in California. This hoisting arrangement was decided on in preference to two or more davit cranes, because no heavy anchor is required to support the equipment.

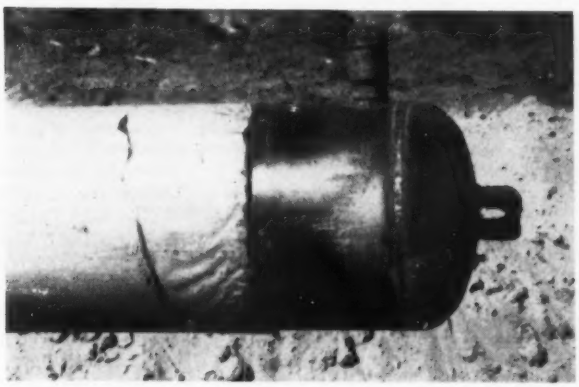
Six modified A-frames are used with this structure, all of which have square floor flanges for attaching to the dock with lag screws. The horizontal cross pieces at the top are reinforced with knee braces, and the two end frames are sway braced by joints of pipe running from the top to the footing of the next frame.

The trolley rail is supported by U-bolts over the cross members at the top and pass through holes on the flange of the rail for bolting. Sagging of the overhanging portion of the rail under a heavy load is prevented by a truss reaching from each end and passing over posts above each end frame. Stops at the end of the rail prevent the trolley from running off the track when a load is brought to the end of the structure for loading on a truck, or when picking up tools to be placed on the floor of the dock.

Pipe Supports for Drilling Rig

ENGINEERS for Fred Manning, Inc., prominent drilling contractor, use special supports for rig piping, eliminating the usual timbers generally used for carrying pipe lines. The stands are made by welding the desired length of 4-in. drill pipe to a circular base, wide enough to form an adequate footing on ordinary soil. The top of the stand is fitted with a section of structural angle to form a V-block in which the line is laid when rigging up. These stands remain in the position originally set, and tend to reduce vibration resulting from pulsation of the pump. The stand also eliminates the usual hazard of walkway obstruction resulting when timber is used for supporting the lines.

Test Head for Pipe-Line Construction



IN certain jobs, when successive joints are welded into sections before laying in the trench, and these are to be tested individually for leaks, some sort of a closure is required. Southern California Gas Co. uses dished heads for this purpose. A given size head can be attached to the next larger pipe size by attaching a concentric dished welding ring. A towing lug is attached to the center of the test head where a heavy chain is hooked, for dragging the tested section into the ditch and into position. A test nipple with collar and plug is welded to the pipeline section near the test head. Later this and the dished head can be removed easily by washing away the welded bead; the test hole is closed with an approved patch. The towing ring is particularly useful when the pipe is covered with Somastic or other hard coating. Attaching the tow chain to the lug in the head prevents a looped chain from breaking the coating, which then must be repaired before the pipe is covered in the ditch.

Control Valve Extension

A Gulf Coast drilling contractor is utilizing the universal joint and drive shaft from junk automobiles to enable crew members to control water line valves at ground level from the derrick floor. The drive shaft is left on the universal and a piece of ¾-in. pipe of sufficient length to reach the derrick floor is welded to it and a gate valve handle attached. At the ground level, the nut which normally fastens the valve's handle is welded to the bottom of the universal joint.

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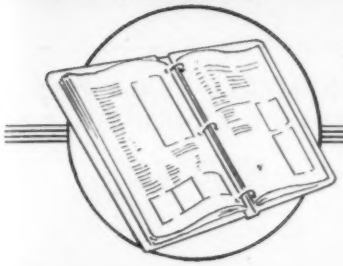

THE REFINER'S notebook

Ratio Flow Control

INTERCHANGEABILITY of receiver controllers or recorders in pneumatic transmission systems has been noted in the previous installment. Some examples of transmitter-receiver combinations have been given. With pneumatic transmission different combinations of receivers and transmitters are possible. The transmitter, while ordinarily an indicating unit, may also embody the recording or controlling function, as is also true of the receiver unit. A common combination is that of the indicating transmitter and a recording receiver-controller. Other combinations include an indicating transmitter-controller with indicating receiver or recording transmitter-controller with a recording receiver.

Ratio Flow Control

In this series on instrumentation reference has been made at various times to pneumatically operated interlocking or cascade control. A somewhat different method of control is provided by the use of the ratio controller. In Fig. 1 (top) we are faced with the problem of adjusting the flow of stream (2) to that of stream (1) to obtain the blended stream (3). The board-mounted flow-recording controller indicated here is a ratio controller. The flow of stream (1)—primary flow—is allowed to vary in accordance with the process. Output air pressure of the primary instrument or transmitter goes to the ratio controller which records the primary flow.

The ratio controller is made up of an adjusting mechanism as well as a standard control system. Employing (preferably) proportional-plus-reset mode, the secondary instrument automatically shifts the set or control point in accordance with changes in the primary flow, holding a fixed ratio between the two flows.

Remote Ratio Control

Through the use of a second transmitter, as indicated in Fig. 1 (center), remote control of the secondary flow is obtained. Measurement of both flows by orifice meters is translated into air pressures transmitted to the ratio controller. Output air pressure from the second transmitter, varying in accordance with changes in the secondary flow (2), is converted in the controller to a pen movement and actuates the baffle lever. Output air pressure from the other transmitter is converted into motion of a second pen and also acts on the baffle lever through a parallelogram linkage by means of which the ratio setting is obtained. Control of the secondary flow is then obtained by varying output air pressure from the controller through the nozzle-baffle and air-relay arrangement as previously discussed in The Refiner's Notebook (June 22, 1950).

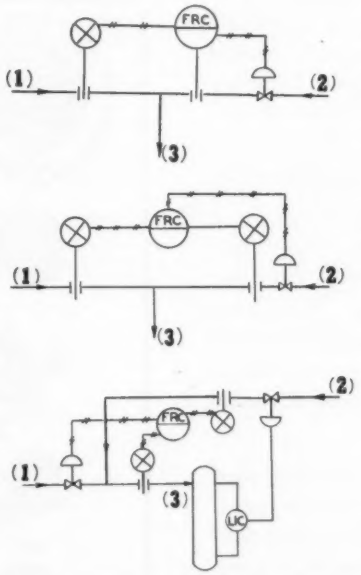

Fig. 1—Ratio flow control. (Top) Conventional ratio flow control. Secondary flow (2) is adjusted to the uncontrolled primary flow (1). (Center) Remote ratio flow control. (Bottom) Ratio control of flow to feed accumulator where metering of stream (1) is impractical.

A different arrangement of remote ratio flow control is indicated in Fig. 1 (bottom). Here orifices are used to measure the flow of stream (2) and of the total flow (3) to a feed accumulator, with the flow of stream (2) being controlled directly by the level controller. This arrangement was adopted due to the highly viscous nature of stream (1) which made it difficult to measure its flow with an orifice meter.

Ratio Adjustments

Since the control point in a ratio control system is continuously shifted according to the changes in the primary flow the transmitter must be one which operates with a linear relation between measured values of the primary variable and the output air pressure. It is important also that (1) both the transmitter and ratio controller chart scales be the same (linear scales on each instrument or square-root scales on each), (2) orifices must be sized on the basis of the approximate basic ratio to be established.

With the basic ratio established it can be maintained exactly, even at large deviations of the primary flow. The ratio between the two flows can be changed, if necessary, within the calibrated range of the ratio dial. Note that ratio action may be direct or inverse. An increase of the primary or uncontrolled flow may result in either an increase or decrease in the secondary or controlled flow. Ratio adjustments are discussed in greater detail elsewhere (see references).

Flow ratio control has been considered here. However, ratio control may be applied to proportion pressures and may be used in connection with heat flow and liquid level control. Sometimes it is necessary to proportion two or more secondary flows to a primary flow.

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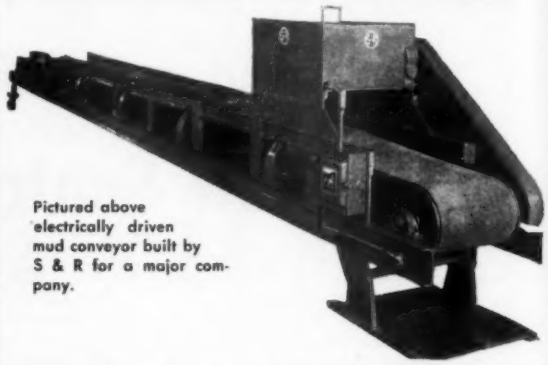

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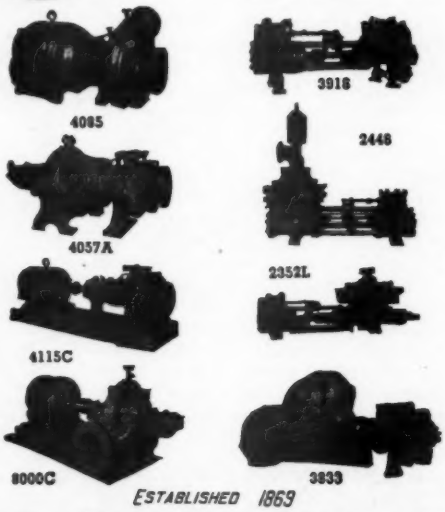

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Solution-Gas-Drive Performance And Oil Viscosity

The subject of this article, and its handling, shows why the Journal's "Engineering Fundamentals" is one of the most popular and highly regarded insertions in the petroleum production-engineering literature. This series continually covers important and significant fundamentals, in easy-to-read and easy-to-file single-page units.

THE performance of solution-gas-drive reservoirs cannot be compared without taking into account variables such as reservoir-fluid characteristics and flow characteristics.[1,2] In this discussion the effect of one of the fluid characteristics, oil viscosity, will be outlined.

The effect of viscosity is important because of its contribution to the producing gas-oil ratio. It is not apparent that the gas-oil ratio at a specified reservoir-fluid saturation will have any effect upon ultimate recovery unless it is realized that gas is the displacing medium and that there is a limit to its availability. Considering two separate cases, if the producing gas-oil ratio is higher at every reservoir saturation in one of the reservoirs, then by the time the gas has been depleted from that reservoir less total oil has been produced and a higher residual liquid saturation exists.

The same idea can be expressed by a plot of gas-oil ratio versus cumulative oil produced. The area under such a plot to the point of depletion is equal to the total gas produced. For solution-gas-drive reservoirs this will be nearly equal to the original gas available. Therefore, if two reservoirs have the same amount of original gas, then that reservoir having the higher current gas-oil ratios will deplete at the lower cumulative production.

Consider, then, the manner in which the oil viscosity affects the producing gas-oil ratio. For a solution-gas-drive reservoir the equation to express gas-oil ratio at surface conditions is:

$$R = \frac{k_g}{k_o} \frac{\mu_o}{\mu_g} \frac{\beta}{v} + r \qquad (1)$$

where

k_g/k_o = the relative permeability ratio, gas to oil
μ_o/μ_g = the viscosity ratio of oil to gas
β = formation volume factor
v = barrels of reservoir space per standard cubic foot of gas
r = solution gas

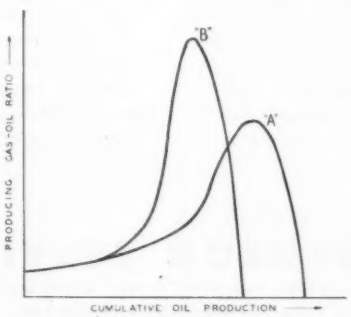

Fig. 1—Variation of producing gas-oil ratio with reservoir-oil viscosity "A" is lower viscosity than "B."

For a given reservoir fluid saturation, k_g/k_o is a fixed quantity. All other fluid properties being constant, therefore, the gas-oil ratio increases as the oil viscosity increases. Ordinarily the gas viscosity does not vary over wide limits so that the entire effect due to viscosity can be attributed to the oil phase.

Now referring to Fig. 1, if curve "A" is plotted for a low-viscosity oil then a similar plot for the same reservoir but with a high-viscosity oil would be curve "B." It is assumed that curve "B" starts at the same point as curve "A" because the solution-gas quantities are equal. The area under the curve "B" is equal to that under curve "A" because the total gas available is the same in both cases. Then curve "A" must go to a higher cumulative production than curve "B" because the gas-oil ratio must be higher for the higher-viscosity oil at a given cumulative oil. Actually curve "B" will not only be higher than curve "A" but will go to a higher peak at a lower ultimate recovery as shown.

Of course, from Equation 1 it is apparent that a change in reservoir oil viscosity is not the only thing that will change the gas-oil-ratio value and consequently the ultimate recovery of a solution-gas-drive reservoir. A change in solution gas (r), formation volume factor (β), gas compressibility (v) and reservoir flow characteristics can also change the gas-oil-ratio history. The effects of these, both separately and compositely, have been discussed in the literature[1,2] where the per cent ultimate recoveries have been computed for certain fixed conditions.

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NAME ..... TITLE .....

OIL AND GAS EQUIPMENT Digest — CHECK IT

10 MANAGEMENT OF INDUSTRIAL RESEARCH is a selected and annotated bibliography of articles and books covering organization, control, program, and laboratory of industrial research activities. *Arthur D. Little, Inc.*

11 NEW HENRY PHASE CONVERTER, a multicolor, four-page bulletin explains the application of a phase converter which makes possible the use of 3-phase, 220-volt motors on single-phase, 220-volt power lines. The phase converter is designed for use with 3, 5, or 7½-hp. motors. Special sizes are available for motors up to 40 hp. *Henry Electric Co.*

12 SANTOLENE C sets forth the characteristics and economy of a rust-inhibiting additive for petroleum products. The product is particularly effective in pipe lines and storage tanks when added to fuel oil, gasoline, or any type of light petroleum product. *Monsanto Chemical Co.*

13 BULLETIN F-90 describes the 2-in. Landmatic taper attachment head designed primarily to cut tapered threads to exacting A.P.I. standards. By limiting cutting action to the throat section of the chaser, it reduces chaser wear and increases thread accuracy. *Landis Machine Co.*

14 R/M NO. 920 features a metallic packing for oil-field, pipe-line, and refinery service that combines long-wearing quality with an anti-frictional surface. The packing, made of asbestos yarn covered with metal foil, is recommended for steam and air rods, centrifugal pump shafts, valve stems, expansion joints, and applications where temperature does not exceed 450° F., and surface speed is not greater than 600 ft. per minute. *Raybestos-Manhattan, Inc.*

15 PRICE CATALOG FOR VALVE SEAT PULLERS. A descriptive price catalog for Red Devil valve-seat pullers for slush pumps contains cutaway diagrams, explanations, sizes, dimensions, and complete prices on valve-seat pullers and parts for practically all makes of slush pumps. *Oil Well Manufacturing Corp.*

16 FOUR-CYCLE, DUAFUEL DIESEL ENGINE TYPE FSG-16. The bulletin presents features of these supercharged or nonsupercharged units from five to eight cylinders with a 16-in. bore and 22-in. stroke. The horsepower range at an operating speed of 327 r.p.m. is from 730 hp. for the five-cylinder, nonsupercharged engine, to 1,750 hp. for the eight-cylinder supercharged unit. *Nordberg Manufacturing Co.*

17 IDEAL TYPE-"B" PORTABLE AUXILIARY UNIT. A four-page two-color, illustrated bulletin presents a portable unit, equipped with diesel or gas-engine drive, 20-kw. d.c., or a.c. generator set, air compressor and receivers, and water pump. *National Supply Co.*

18 PERIODIC INSPECTION CHART helps fire inspectors keep accurate records of their extinguishers. Space for 26 inspections of up to 38 extinguishers is provided. *Ansul Chemical Co.*

19 SAFETY CUTOUT SWITCH. Bulletin No. CS-50 describes in detail the working principles of the cutout switch, which will shut down the prime mover on the pumping unit when the rod string breaks, or when any part of the machine fails or gets out of adjustment. *International Derrick & Equipment Co.*

20 CATALOG 550 carefully itemizes babbitted journal boxes, roller-bearing pillow blocks, centrifugal slurry pumps, water valves, conveyor takeups, roller holdbacks, and perforated steel screen plates. Also included is specification information on drive pulleys, V-belt sheaves, gears, sprockets, shafts, and keys. *McNally Pittsburgh Manufacturing Corp.*

21 SO YOU WANT TO USE TUBING is a 60-page catalog dealing entirely with bending, warehousing, and fabricating of pipe and tubing. Actually, this booklet is a text on pipe and tube bending, covering all sizes of pipe, a great variety of bends, and most alloys. *Wallace Supplies Manufacturing Co.*

22 TM ALLOY STEEL SPINNING CHAIN. Greater resistance to wear and longer chain life are additional favorable factors, according to Bulletin 76. Its contents include prices, complete details, and specifications. *S. G. Taylor Chain Co.*

FOR MORE INFORMATION . . . . use one of these cards

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, July 20, 1950

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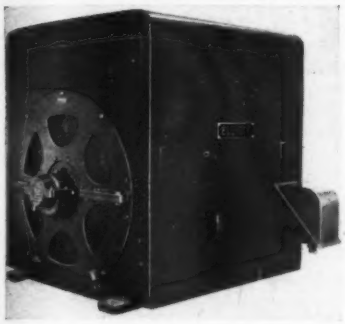
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Dan B. Miller

23 UNIT-COOL'D design introduces a totally new idea for the cooling of large enclosed motors. A finned-tube air-to-air heat exchanger, comprising a single rectangular unit, is located at the top of the welded-steel motor frame. Fan draws cooling air from outside the motor, through the tubes, and out the front of motor enclosure. Air within the motor is passed over finned tubes, cooled, and recirculated. For cleaning or inspection, removal of a single face plate exposes all cooling tubes and a wire brush or tube cleaner can be passed through them. If repair or replacement is required, the entire heat-exchanger unit can be drawn from the motor enclosure. *Elliott Co.*

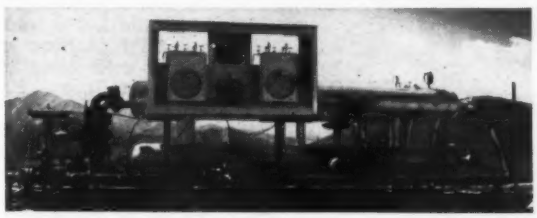


IT'S NEW CHECK IT

24 MODEL KC 45-H DRILL is ruggedly built, making it outstanding where hard drilling is encountered. It is suitable for shot-hole and core drilling, as well as water-well drilling. Pipe up to 5¼-in. diameter may be set through the rotary table, and the table is easily removed, giving a full 12-in. opening. The three-speed rotary transmission gives a wide selection of rotary speeds for all types of drilling. Machine has a rated capacity of 1,500 ft. of 5-in. diameter hole, using 2⅜-in. tool-joint drill pipe. Outstanding features are increased capacity hydraulic pull-down mechanism and a redesigned chain-transmission case. Larger clutches give increased power where it is needed. Can be mounted on any 2 or 3-ton truck with 159 to 178-in. wheel base, or a light tandem rear-axle truck with approximately 154-in. trunnion wheelbase. *Franks Machine Co.*

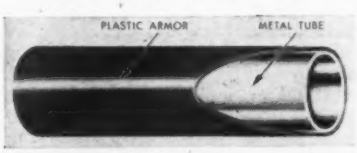
IT'S NEW CHECK IT

25 NEW TWO-STAGE, SKID-MOUNTED, HORIZONTAL SEPARATOR can be quickly disconnected because of the use of a minimum of fittings, and towed to the next location. The skid base is of a simple design somewhat like a sled runner, allowing swift transportation of the unit. This mobility makes the unit valuable as a test separator on wildcat wells. This model operates with 600 lb. high pressure, 150 lb. low. Skid-mounted separators are used individually or in tandem, as desired, making them practical for operations of varying volume. *American Pipe & Steel Corp.*



IT'S NEW CHECK IT

26 DEKORON TUBING. A new low-cost corrosionproof instrument tubing made of metal with a 1/32-in. coating of extruded thermoplastic is especially useful in laboratories, refineries, or other plants where there is a corrosive atmosphere. The thick, chip-proof plastic coating, made by a patented extrusion process, grips the tube tightly and completely protects the tubing from corrosion danger. The plastic



The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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coating is immune to moisture, salt air, oils, acids, and alkalies. Available in ¼ and ⅜-in. diameters, it can be bent easily, like ordinary copper tubing, and the plastic coating also serves as color coding for the line. *Samuel Moore & Co.*

IT'S NEW CHECK IT

27 WS WIDE-FACE TUBING TONG was engineered and designed with the safety of the tubing and well-pulling crew in mind. The rollover design is exclusive in manual tubing tongs. The spring-action pin permits the operator to use the tong for making-up or breaking-out operations. It is light in weight and fits perfectly because it was designed for tubing only. Made in individual sizes to handle 2, 2½, and 3-in. A.P.I. tubing and couplings, it eliminates tubing failures. Flattening, crimping, and bottle-necking of thin-wall tubing are eliminated due to the wider face and true bore. *Byron Jackson Co.*

IT'S NEW CHECK IT

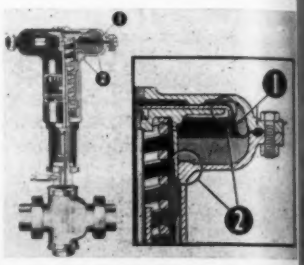
28 SERIES 240A KARBATE HEAT EXCHANGERS. The new, larger, standard 240A heat exchangers, similar in construction to the series 70A and providing 71 sq. ft. of heat-exchange surface, possess chemical resistance to practically all corrosive fluids, resistance to severe thermal, shock, and high heat-transfer rates. Single, double, or four-pass routing of the tube-side fluid is effected by a simple change of fixed and floating and cover assemblies. In addition, oversize shell side connections contribute to the flexibility of the new unit which may be operated in either a vertical or horizontal position. The maximum recommended hydrostatic operating pressure is 75 psi., maximum steam pressure 50 psi., and working temperature 338° F. *National Carbon Division, Union Carbide & Carbon Corp.*

IT'S NEW CHECK IT

29 FORMULA 73, a wartime chemical cleaner which was developed for precleaning and post cleaning of welding and silver brazing operations, can be used as a flux, and is now used for preparation of sweat fittings on copper and brass tubing. It will remove rust immediately on contact. It is noninflammable and nontoxic and can be used with no danger to the hands or face. It is simply sponged onto the surface to be cleaned; agitated with steel wool or cloth, and then removed along with dirt and impurities, with a clean cloth. It has a detergent action as opposed to an acid and will easily clean copper, brass, steel, iron, and stainless steel. It will remove fluxes, heat scale, and any surface corrosion. *Sully Engineering, Ltd.*

IT'S NEW CHECK IT

30 POWERS FLOWRITE VALVE is diaphragm operated for pressures below 250 psi. in sizes ¼ through 8 in. It is a new air or water-operated control valve for regulating flow of steam, water, oil or gases. Durable molded neoprene diaphragm (1) has positive sealing bead which provides increased sealing action with increasing control pressure. Efficient diaphragm form insures ample and constant operating power through full travel. Piston plate assembly (2) has a free-floating thrust plate which absorbs side thrust. Has enclosed, rustproofed steel spring for full travel in 5 or 10 psi. control pressure change. The polished stainless-steel stem in preformed lubricated metallic packing insures long life and low hysteresis. Available in single or double seat, double unions and flanged ends, direct or reverse acting, and three-way valves. *Powers Regulator Co.*



IT'S NEW CHECK IT

31 MAGNETIC FISHING TOOL is run into the hole either on a wire line or on the end of drill pipe; the former is the preferred method but the latter is sometimes necessary in order to wash the fish clear for the magnet to make contact. The magnet exerts a pull of 35 psi. and is particularly effective in recovering cones, bearings, tong chains, tong inserts, and other awkward pieces of metal. Retains its strength almost indefinitely. It is available in various sizes. The largest and most powerful made to date has a housing outside diameter of 10½ in. and can lift over a ton. *Kingston Instrument Co., Ltd.*

IT'S NEW CHECK IT

32 SURE SHOT DEVIATION RECORDING INSTRUMENT can be easily transported from one rig to another. This instrument is similar in all respects to the Model B Sure Shot with the exception of the manufacture of the outer barrel and shock absorber in two pieces each instead of long one-piece units. This has resulted in the placing of the entire instrument in a handy carrying case only 40 in. long and 16 in. wide.

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FIN-TYPE COOLING FOR ANY SERVICE ON WHICH AIR COOLING IS PRACTICAL

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31 HAPPY YEARS

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Odessa	Texas
Salem	Illinois
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DISTRICT REPRESENTATIVES:

Kilgore	Texas
Wichita Falls	Texas
Wichita	Kansas

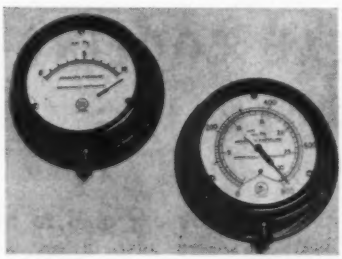
that can be easily carried by hand or the trunk compartment or between the seats of any automobile. *A-1 Bit & Tool Co.*

IT'S NEW CHECK IT

33 PIPELINER. A new light-weight, mobile, engine-driven direct-current arc welder, especially designed for pipe-line welding where light-weight equipment is essential for easy handling and moving, but with a hot, fast, dependable arc and plenty of engine power to keep production up to schedule. Its generator is rated 250 amp. at 40 volts on 60 per cent duty cycle and has a welding range of 30 to 325 amp. It is designed with five main steps or ranges. One hundred steps of fine adjustment in each range provide for 500 different combinations of welding current and open-circuit voltage. In addition to exciting the main generator fields, an inbuilt, four-pole exciter is large enough to provide an additional full kilowatt of 110 volt d.c. electric power. Through a power-outlet receptacle on the control panel, this power may be used for operating lights and tools on the job. *Hobart Brothers Co.*

IT'S NEW CHECK IT

34 ABSOLUTE PRESSURE GAGE MODEL AV4 has a 4-in. nominal dial diameter and is made in ranges of 0 to 10 mm. Hg. up to 0 to 800 mm. Hg. It is independent of ambient pressure and temperature variations, has no manometric fluids, is nonelectric, and provides direct and continuous pressure indications. The gage is not damaged by system leakage, is not affected by gravity or nature of gas or vapor, and is light in weight. *K. D. G. Instruments, Ltd.*



IT'S NEW CHECK IT

35 LIFT-ALL, a new electric hoist designed for one-man operation, will hoist, lower, stop, and hold weights up to 2,000 lb. It operates on its own shop dolly, or from any desired position on a truck bed, and can be quickly shifted from one mount to another by one person. Using push-button control, the operator is free to move about for load guidance. The boom, easily adjustable for height, swings completely around with its load. An ordinary 6-volt car battery is used on the dolly, and the truck battery supplies ample power when the lift-all is truck-mounted. *Lift-All Equipment Co.*

IT'S NEW CHECK IT

36 NEW BELTED GENERATOR can be belted to any available power unit or tractor whenever power is needed in case of high-line difficulties or failures, or for service in remote areas. It is furnished in two sizes: 3 and 5 kw. It is of the four pole, self-excited type designed for operation at 1,800 r.p.m., 60 cycle, 120 volts. The frame of the generator is of dripproof construction for service when exposed to the weather. Two Twist-lock receptacles are furnished with the 3-kw. units and three with the 5-kw. units. A convenient slide rail also makes it possible to adjust the belt tension after the power unit has been spotted in place. *Fairbanks, Morse & Co.*

IT'S NEW CHECK IT

37 12% CHROMIUM ALLOY STEEL CASTINGS for use in gas-condensate wells in many parts of the world is helping to solve a multimillion-dollar corrosion problem for the oil and gas industry. The alloy possesses physical properties sufficient to withstand the high internal pressures and test pressures of gas-condensate well service often as high as 10,000 to 15,000 psi. with yield points ranging from 50,000 to 160,000 psi., depending on heat treatment, and a wide range of necessary mechanical properties. *Lebanon Steel Foundry.*

IT'S NEW CHECK IT

38 DUALTRONIC is a combined pipe locator and leak detector. It is easy to handle, light in weight, inexpensive to operate, does the work of two instruments, and makes possible for companies to offer much lower bids, because of labor savings. *Goldak Co.*

IT'S NEW CHECK IT

39 FULL-THROTTLING, FULL-FLOW VALVE. A new 200-lb. bronze W.S. globe valve features extra high lift of the disk, exceptionally large flow areas above and below the seat, and wide nominal pipe size opening through the seat. Advantages that result are full flow through the seat when the valve is fully open, turbulence is practically eliminated, while pressure drop is cut to the minimum. Renewable, regrindable cone-shaped disks and seats are of stainless steel hardened to approximately 500 Brinnel for maximum erosion resistance. Valves are available with screwed ends, and in sizes from ⅛ to 3 in., inclusive. *Wm. Powell Co.*

NATURAL GAS

Panhandle Hearing

FPC sets August 14 as date to hear various questions

WASHINGTON.—A consolidated hearing will be held before the Federal Power Commission here beginning August 14 on a number of interrelated proceedings which involve Panhandle Eastern Pipe Line Co., Kansas City, Mo.

The first issue to be taken up by the commission will be whether the sales capacity of Panhandle's pipeline system in the Midwest is adequate to meet demands during the coming winter, and if not, the just and reasonable service rules and regulations which should be made applicable to natural-gas deliveries. Also to be heard by FPC are the following questions:

1. Whether FPC should grant either of two requests for commission orders directing Panhandle to supply natural gas for deliveries to the southeastern Michigan area. In one case three cities, Port Huron, Marysville, and St. Clair, have asked FPC to order Panhandle to establish a connection for sale of gas to Detroit Edison Co., now distributing manufactured gas in these areas; in another proceeding, Southeastern Michigan Gas Co. is seeking FPC authorization to build 55 miles of pipe line which would bring gas to Macomb and St. Clair counties. The firm has asked FPC to order Panhandle to supply gas for the proposed project.

2. Application by Panhandle seeking a disclaimer of jurisdiction or in the alternative, authorization to install facilities to connect the Panhandle line with one to be built by Ford Motor Co. in order to supply gas for industrial uses in that firm's Dearborn, Mich., plant. A related proceeding to be heard at this time involves a complaint by Michigan Consolidated Gas Co. against Panhandle alleging that it has filed nine applications with Panhandle to purchase 51,000,000 cu. ft. of gas daily for resale to large industrial consumers on an interruptible basis. The complaint also contends that Panhandle is now able to supply this gas.

3. The form of tariff which should be applicable to volumes of gas delivered from Panhandle's system when capacity has been increased by additional supplies to be received from Trunkline Gas Supply Co.'s Louisiana-to-Illinois line recently approved by FPC.

4. Panhandle's application for authorization to export approximately 27,350,000,000 cu. ft. of gas per year to Union Gas Co. of Canada, Ltd.

5. What would be a fair and equitable distribution among Panhandle's present and prospective customers of the volume of gas to be available upon completion of Trunkline's project, and Panhandle's facilities now under construction.

6. Whether Panhandle's present rates are "unjust, unreasonable . . . or preferential."

7. The just and reasonable rates which should be made applicable to the gas deliverable from Panhandle's system when sales capacity has been increased by the supply of gas to be received from Trunkline.

El Paso Rate Investigation

WASHINGTON.—An investigation of rates charged by El Paso Natural Gas Co. and it wholly owned subsidiary, El Paso Gas Transportation Corp., has been instituted by the Federal Power Commission in connection with the transportation or sale of natural gas subject to FPC jurisdiction.

FPC said that on the basis of available data, rates charged by the two firms may be "unjust, unreasonable, unduly discriminatory, or preferential," and that "it is necessary and proper, in the public interest . . . that an investigation be instituted. . . ."

El Paso Natural operates a pipeline system extending from Texas through New Mexico and Arizona to the Arizona-California border. El Paso Gas Transportation's line connects with its parent company's system near the city limits of El Paso, Tex., and extends into and through the city.

In a concurrent order FPC accepted for filing a rate schedule submitted by El Paso Natural to cover sale of gas to Pacific Gas & Electric Co. as authorized in an FPC order of February 28, 1949. This order authorized El Paso and P. G. & E. to construct pipe-line facilities for transportation of 250,000,000 cu. ft. of gas daily for ultimate sale of Central and northern California.

FPC said the schedule is "ambiguous" and not adequately supported by the cost data.

Natural Gasoline

T.G.T. Plant Under Way

GREENSBURG, Ky. — Construction is under way near here on a $12,000,000 plant for extraction and recovery of liquid hydrocarbons from natural gas for Tennessee Gas Transmission Co. The plant will be adjacent to the company's natural-gas pipe-line system, which runs from Texas to the Appalachian area.

The new plant is being constructed to process initially in excess of 600,000,000 cu. ft. of natural gas daily, from which approximately 400,000 gal. of liquid hydrocarbons will be obtained.

Safety Record Set

BARTLESVILLE, Okla. — Phillips Petroleum Co.'s Panhandle district natural-gasoline and gas departments completed 1,000,000 man-hours of work without a lost-time accident on July 2, K. S. Adams, president, announced last week.

Consisting of more than 1,000 employes in seven Texas Panhandle counties, the district started its record on January 19. Employes are engaged in maintenance and operation of natural recovery and processing plants, gas lines, and gas-gathering systems.

The 1,000,000-hour period is the second for that district. From July 1 to December 7, 1948, employes in the area worked 1,149,090 hours without a lost-time accident, F. E. Rice, vice president of the natural-gasoline and gas department, said.

C.N.G.A. Elects Officers

LOS ANGELES.—R. S. Tulin, manager of the natural gas and gasoline department of Shell Oil Co., has been elected president of the California Natural Gasoline Association for 1950-51, succeeding J. B. Taylor, Signal Oil & Gas Co. The election was held during the annual meeting of the association in the Jonathan Club here last week.

R. S. TULIN

G. C. McLAREN

George C. McLaren, general superintendent of the southern district natural-gasoline department, Standard Oil Co. of California, was named vice president; and E. R. Millett, Jr., was named secretary-treasurer.

In addition to the past presidents who are exofficio members, the following were named to the executive committee: F. E. Bradley, C.C.M.O. Co.; C. L. Case, Continental Oil Co.; R. C. Enderly, Wilmington Gasoline Co.; W. H. Kraft, Honolulu Oil Co.; H. M. Paulsen, Norwalk Co.; E. W. Walker, Western Gulf Oil Co.; P. E. Foote, Petrolane, Ltd.; William Moeller, Jr., Southern California Gas Co.; J. S. Fluor, Jr., Fluor Corp., Ltd.

THE NEW CAMERON TYPE "H"

3 in 1 Choke

SIMPLIFIES BEAN CHANGING AND CONVERSION TO POSITIVE OR ADJUSTABLE

1 To change flow beans, simply tap the bonnet nut to loosen the connection. Trapped pressure is automatically relieved and the nut spins off.

2 Unscrew the bean retainer, which carries the bean in a sleeve, the sleeve being a part of the retainer.

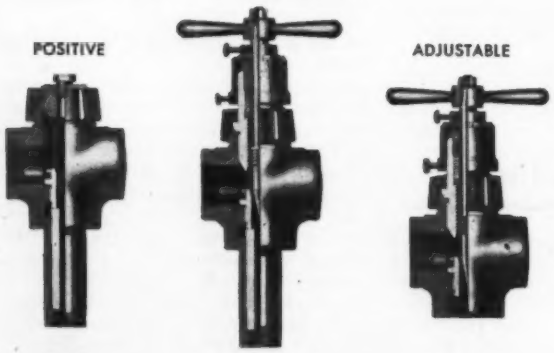
3 The plain positive choke may be converted to a combination positive and adjustable by substituting a needle and bonnet assembly for the blanking plug. Or, a plain adjustable choke may be had by removing the cage nipple and substituting a seat for the positive bean retainer.

CHOICE OF THREE CHOKES IN A SINGLE BODY

POSITIVE AND ADJUSTABLE

POSITIVE

ADJUSTABLE



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Cameron Type "H" Production Chokes feature interchangeable parts which provides the operator maximum flexibility of choice in arranging flow control assemblies. The bodies are forged steel, tee or cross type, with threaded or API flanged connections. Needles and seats are of hardened stainless steel and are available in hard faced steel if desired. Complete details will gladly be sent on request, or see your Composite Catalog.

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PIPE LINES

13-Mile Line Completed

TULSA.—Sheehan Pipe Line Construction Co. announced here this week that it has completed a 13-mile, 24-in. natural-gas line for Southern Natural Gas Co., from Benton to Pickens, Miss. J. W. Brown, headquartered at spread field office at Yazoo City, Miss., was spreadman.

Sheehan is also constructing a total of 223 miles additional for Southern Natural. J. W. Brown is supervising construction of 95 miles of 18-in. from Gwinville, Miss., to the Alabama state line, and this spread is to be completed around October 1. Headquarters are at Mager, Miss.

Other work under way for the company includes the following: 7 miles of 24-in. near Carrollton, Ga., with C. M. Brown serving as spreadman, headquartered at Carrollton; 4 miles of 24-in. near Talledega, Ala., in charge of C. M. Brown; 85 miles of 18-in. from the Mississippi-Alabama line to Selma, Ala.; and 32 miles of 16-in. from Wetumpka, Ala., to Tallahassee, Fla.

The company has a contract from Southern Natural for five multiple-line river crossings in Alabama and Mississippi, consisting of 12-in. pipe, but work crews have not been organized.

Texas Empire Crude Line

TULSA.—O. R. Burden Construction Corp. announced last week that work is scheduled to be completed soon on a 43½-mile, 16-in. crude-oil line from Wilmington, Ill., to East Chicago, Ind., for Texas Empire Pipe Line Co.

Field headquarters are at Chicago Heights, Ill., with O. P. Hines serving as spreadman.

Trunkline Changes Name

HOUSTON.—The name of Trunkline Gas Supply Co. has been changed to Trunkline Gas Co. by action of the board of directors.

Trunkline has Federal Power Commission approval for a 1,219-mile,

***BRUSH EATER.**—Newest development in pipe-line right-of-way clearing is this "Bushwacker," a 28,000-lb. monster that gobbles up and spits out in little pieces all brush and trees ranging up to 8 in. in diameter. The odd-looking machine, mounted on a crawler-tractor, can operate at 1½ m.p.h. in medium growth and clear an acre of ground per hour. Small trees are pushed over by the heavy forward edge of the machine. The 20-lb. steel flails shown hanging from the cylinder strike the objects at a speed of 11,500 ft. per minute, disintegrating wood and leaving a mulch on the surface of the ground behind the Bushwacker. On a 127-acre field test, the machine cleared the land at an actual cost for fuel, lubricants, and labor of $6.57 per acre. Paul Wallack, right, of Walco Engineering & Construction Co., Tulsa, here describes operation of the machine to H. L. Drake, purchasing agent of Service Pipe Line Co., during a demonstration last week near Tulsa. The Bushwacker is manufactured by American Steel Dredge Co., Inc.*

17 YEARS'
CRC
PIPE LINE CONSTRUCTION EXPERIENCE
CRUTCHER - ROLFS - CUMMINGS, INC.
Pipe Line Equipment and Supplies
Houston - Tulsa

CLEVELANDS

THE WORKINGEST MACHINES YOU EVER SAW OR USED...
CLEVELAND Trenchers—fast, rugged, easy to handle on the job and to move from job to job—assure you most trench in most places at least cost on all your oil field projects.
THE CLEVELAND TRENCHER CO.
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XUM

10-26-in. line from McAllen, Tex., to Tuscola, Ill. It recently let construction contracts for the project.

The company is 60 per cent owned by Panhandle Eastern Pipe Line Co., and Hy Byrd, a Panhandle Eastern director, is head of the Houston office.

Ocean-Line Spread Formed

PORT LAVACA, Tex.—Spread has been organized for work on the world's first ocean-going natural-gas pipe line, Submarine Pipeline Construction Co., Inc., announced this week.

The 9-mile, 8⅝-in. Marine Gathering Co. line will run from Rollover Bayou to Pure Oil Co.'s well in the gulf.

Sammy Collins has been named spreadman, with field office located at Mexico Beach, in Calcasieu Parish, Louisiana. Work is scheduled for completion by September 15.

Trojan Is Raising Line

OKLAHOMA CITY.—Trojan Construction Co., Inc., reported last week that it is now taking up 190 miles of 10-in. products pipe line formerly owned by Shell Pipe Line Corp.

Maurice Crawford is spreadman on the job, with field offices at Lebanon, Mo. Work is expected to be completed in early September.

Williamson Gas Line Pigs* Traverse 1½R 90° Bends

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THE PIG WITH THE POKE CLEANS PIPE LINES

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Commonwealth Natural Line

EL DORADO, Kans.—Ray L. Smith & Son, Inc., contractor on 104 miles of 18-in. line for Commonwealth Natural Gas Corp., reported last week that work is expected to be completed on the complete project between Stanardsville and Richmond, Va., by September.

Don C. Smith is spreadman operating out of Orange, Va., and William G. Frost is spreadman with headquarters in Richmond.

The company also has contract for 84 miles of 12-in., and 20 miles of 8-in. laterals to various cities, which will be completed after the main 104 miles, 18-in. line is completed.

Application Is Withdrawn

WASHINGTON.—Cities Service Gas Co., Oklahoma City, has been permitted by the Federal Power Commission to withdraw its application proposing construction of approximately 42.6 miles of natural-gas line, and abandonment of approximately 127.3 miles of line, all in Kansas.

The company filed a notice of withdrawal on June 28, stating that construction requirements of an emergency nature elsewhere on its pipeline system during the current year required that consideration of the projects involved in the application be deferred.

The proposed construction was to provide greater capacity on the Cities Service system to meet increased demands in the Wichita-Newton, Kans., area. The company proposed to abandon the line which now serves that area because of excessive maintenance and leakage.

Seek Additions to Systems

WASHINGTON.—Four subsidiaries of Columbia Gas System, Inc., have filed a joint application with the Federal Power Commission asking for authorization to make additions to their natural-gas transmission systems in Ohio, West Virginia, Pennsylvania, and New York. Total estimated net cost of all projects is $1,664,570.

Manufacturers Light & Heat Co., Cumberland & Allegheny Gas Co., Natural Gas Co. of West Virginia, and Home Gas Co., filed the application.

Only one of the four projects, Home Gas Co.'s, involves the sale of gas to a new territory. The other three companies would use the proposed facilities to provide continuous service to existing customers and to provide for normal growth within the territories presently served by them.

Manufacturers is proposing to construct approximately 44 miles of pipe line ranging from 4 to 16-in. at various points on its system in Ohio, Pennsylvania, and West Virginia, and to install two additional 500-hp. com-

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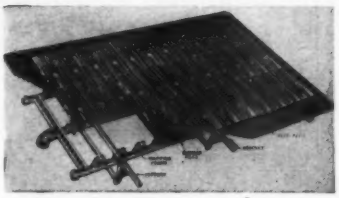

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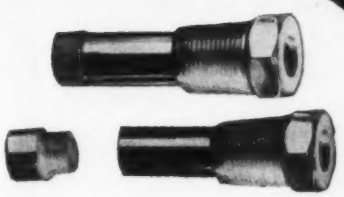

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WRITE FOR BULLETIN 329P
POWERS

pressor units and dehydration equipment at an existing compressor station. In addition, Manufacturers plans to retire a total of about 7.8 miles of line and an aggregate 970 hp. in compressor units in Pennsylvania. Net cost of the Manufacturers project is $1,307,970.

Natural Gas Co. of West Virginia is seeking authorization to build about 4.5 miles of 4, 6, and 8-in. line in Ohio at an estimated cost of $110,400. The Cumberland & Allegheny project involves the construction of 10.3 miles of 6 and 8-in. line and a 65-hp. compressor station in West Virginia. Estimated net cost of this project is $230,-200.

Home Gas Co. would install a meter and regulating station, estimated to cost $16,000, in Rockland County, New York, for the purpose of selling gas to Rockland Gas Co., Inc., for resale in Ramapo, Tuxedo, Tuxedo Park, and Sloatsburg, all in New York state.

Radio-Bid Decision

WASHINGTON.—The Federal Power Commission has dismissed for lack of jurisdiction an application of Montana-Dakota Utilities Co., Minneapolis, for authorization to install and operate radio facilities along the route of a natural-gas pipe line which is now under construction in Montana and Wyoming.

FPC said that the communication equipment falls within the scope of the installations described in Section 2.55 of the commission's general rules and regulations and no certificate is required for its installation and operation.

Section 2.55 provides that the word "facilities," as used in Section 7(c) of the Natural Gas Act, shall be interpreted to exclude those installations which are merely auxiliary or appurtenant to an existing transmission pipe-line system and which are installed only for the purpose of obtaining more efficient or more economical operation of authorized transmission facilities.

Tennessee Facilities O. K.'d

WASHINGTON. — Tennessee Natural Gas Lines, Inc., Nashville, has received Federal Power Commission authorization to expand its pipe-line facilities in order to increase natural-gas deliveries to Nashville Gas & Heating Co. for distribution in the Nashville area.

The additional deliveries will also enable Nashville Gas & Heating Co. to provide natural-gas service to Madison, Amqui, Rayon City, Old Hickory, and Du Pontonia, Tenn., all presently without any gas service, and to provide interruptible gas service to one direct industrial customer, a plant of the E. I. du Pont de Nemours & Co., Inc., near Old Hickory.

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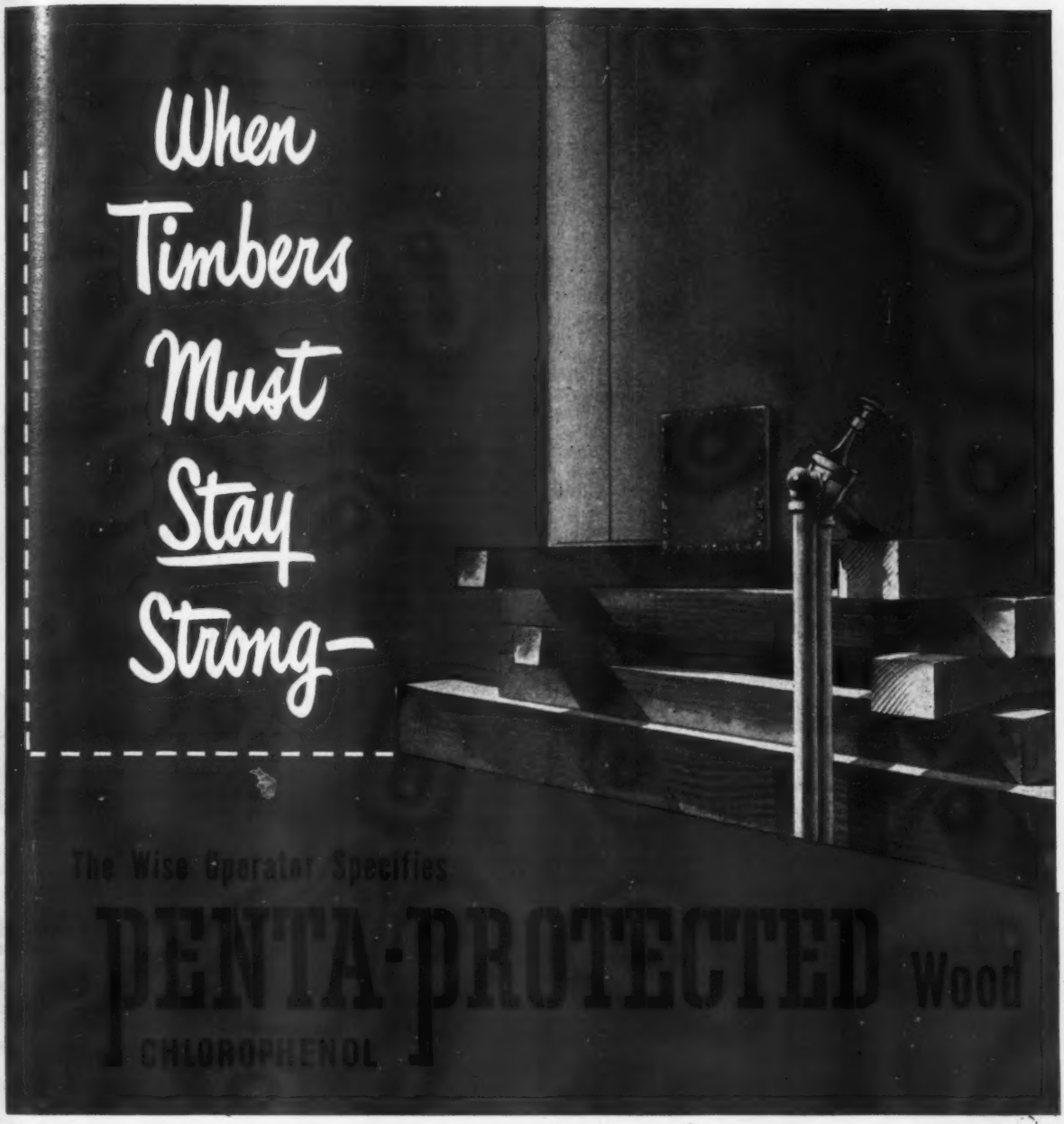

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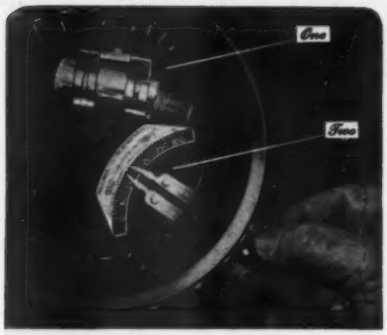

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REFINING

Contract Let

Socal's Richmond plant to get vacuum flasher

RICHMOND, Calif.—Standard Oil Co. of California has awarded a contract for what is considered the world's largest vacuum flashing unit to M. W. Kellogg Co., New York, as part of a general modernization program at California Standard's Richmond refinery. The unit will be able to charge 55,000 bbl. of reduced crude daily.

The Kellogg firm said that the main vessel in the unit will stand 80 ft. high and will have a maximum diameter of 27 ft. Its design capacity is believed to exceed by 15 per cent the largest vacuum unit currently in operation.

The unit is being designed to provide approximately 30,000 bbl. of feed each day for the existing catalytic cracking unit at Richmond, which is scheduled for revamping during the modernization program. Asphalt, the other major product from the flasher, will be charged to vis-breakers to produce high-quality fuel oil and gasoline.

The new unit, scheduled for completion next May, will charge not only reduced crude from California's Richmond and El Segundo refineries, but will also process some heavy crudes termed "nonrefinable."

Present capacity of California Standard's Richmond refinery is 138,000 bbl. of crude-oil charge daily, including 56,000 bbl. thermal cracking and 32,500 bbl. catalytic cracking

Platforming Unit Planned

LONGVIEW, Tex.—Premier Petroleum Co. plans to install a Platforming unit at its Fort Worth refinery, which will be the first to be installed in Texas.

The unit will be designed to handle approximately 1,500 bbl. of charge stock daily, and design and construction will be under supervision of Universal Oil Products Co.

Premier said that work will get under way "as rapidly as possible." Present capacity of the refinery is 8,000 bbl. of crude charge daily, including 5,000 bbl. thermal cracking capacity.

New Asphalt Refinery

EDMONDS, Wash.—Construction will begin here August 1 for Union Oil Co. on a new $1,000,000 asphalt refinery, Reese H. Taylor, president, announced last week.

The plant will have an annual capacity of 65,000 tons of paving asphalts, road oils, and cutbacks when completed in June 1951.

Bechtel Corp. will handle construction, including blending tankage and shipping facilities. Crude will be shipped by tanker from California.

"The constantly increasing activities in the Pacific Northwest in industry, irrigation projects, and highway construction have made it necessary for the company to construct this new refinery in order to better serve this growing area," Taylor said. "The new facilities will also enable the company to improve its service to the important Alaska markets."

Unit Completed

Solvent lube-oil plant on stream at Lima, Ohio

LIMA, Ohio.—Standard Oil Co. (Ohio) announced this week that a $13,000,000 solvent lubricating-oil plant, the third major unit to be completed in the company's $30,000,000 expansion program at its Lima refinery, is now on stream.

The lube-oil plant comprises five new integrated units and will have a storage capacity of 500,000,000 bbl. of oil in 52 tanks, S. R. Bolles, refinery manager, said. Godfrey Ladd is in charge of the new plant, which will have approximately 50 other employes.

Sohio earlier this year completed a new $11,000,000 catalytic cracking plant and a new $5,500,000 continuous crude-coker at the Lima refinery. A fourth unit, the central shop building, is now under construction, and H. K. Ferguson Co., contractor, expects to complete it during the next month.

E. B. McConnell, vice president of Sohio in charge of manufacturing, said the Lima refinery will hold open house in October, when all units will be in full operation.

The Lummus Co. and M. W. Kellogg Co. constructed the lubricating-oil plant, the latter installing the deasphalting unit. The plant will produce 20 different products, and has a total capacity of 75,000 gal. of finished lubricating oil daily.

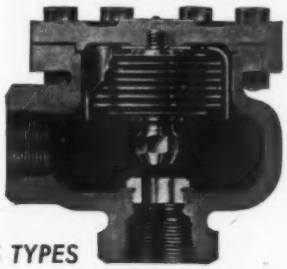
New Furfural Process in Use

EAGLE POINT, N. J.—The Texas Co. now has its new furfural process in use in a commercial unit operating at its new $60,000,000 refinery here, Michael Halpern, vice president of refining, said last week.

Basic value of the new application is seen in substantial improvement

Nicholson Steam Traps

STOP BACK-UP of CONDENSATE



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of cetane number in diesel fuels, improved burning quality of domestic heating fuels, and reduction of sulfur content of all products. (A detailed engineering article on the new furfural process, appeared in *The Oil and Gas Journal, Annual Refining Issue, March 23, 1950, page 211.)*

Texaco-Union Agreements

NEW YORK.—The Texas Co. here has received word from local Texaco managements in Norfolk, Va., and Detroit that locals of Oil Workers International Union (C.I.O.) have accepted for the employes the improvements in the company's group life insurance, pension, and other benefits plans, as offered by Texaco.

Local 389 of O.W.I.U. accepted the company's offer covering employes in the bargaining unit at Detroit and River Rouge, while Local 543 at Norfolk accepted terms for employes in the bargaining unit in that area.

Benefits offered by The Texas Co., at no additional cost to its employes, include a 50 per cent increase in life-insurance coverage (or the equivalent of 18 months' pay), more generous past-service pensions, and several improvements in the firm's hospital and surgical-benefits plan.

A contract was signed by the company with Local 539, O.W.I.U. early this month covering employes in Long Island City, Brooklyn, Glenwood Landing, Ossining, and New Rochelle, N. Y., bulk plants, and the firm's Long Island City repair shops. *(The Oil and Gas Journal, July 6, 1950, page 83.)*

New A.I. Members Named

NEW YORK.—The Asphalt Institute, national nonprofit organization of the petroleum-asphalt industry promoting development and use of asphaltic products, has announced that four companies have been added to its membership, making the total 40.

Newly added firms are: Empire Petroleum Co., Denver; Pan-Am Southern Corp., New Orleans; Southland Oils., Inc., Rogerslacy, Miss.; and A. Johnson Co. of Sweden. All were elected by the A.I.'s board of directors.

Meanwhile, Bernard E. Gray, A.I. president, announced that a compilation of figures recently released by the U. S. Bureau of Mines shows that petroleum asphalt and road oil used for paving in the United States last year reached the new record total of 7,372,800 tons, nearly 3 per cent higher than the 1948 record. This paving tonnage, Gray said, represents 73.7 per cent of the asphalt and road-oil total figure for 1949 of 10,049,100 tons.

A.I. also announced that it has appointed William H. Rhodes as its district engineering representative to cover Louisiana and Mississippi.

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Among the Drilling Contractors

Pike Moves to Expanded Quarters at Long Beach

Operating headquarters for Thomas P. Pike Drilling Co. at Long Beach, Calif., have been moved to new and enlarged offices and yard facilities, located at 3460 Cherry Avenue, in the Signal Hill district.

The new quarters, including office building, shops, garage, warehouse, and yards, cover an area of 5 acres. Among those having offices at the Long Beach headquarters are H. G. Haney, vice president and general superintendent; John Fowler, assistant superintendent; Harold Jordon, assistant superintendent; and Perry Isham, head mechanic.

Executive headquarters for the company remain in Los Angeles.

Rush to Head Committee

Ralph L. Rush, Trinity Drilling Co., Dallas, has been appointed by Warren S. Churchill, president of the American Association of Oilwell Drilling Contractors, as chairman of the association's Insurance Committee. He succeeds W. C. Morris, Allen & Morris, San Antonio, who resigned because of ill health.

Sitton Leaves Pioneer

Wayne Sitton, superintendent for Pioneer Drilling Co., Casper, Wyo., has resigned to become a partner with Carl and Dan B. Lesh in the Lesh Drilling Co., St. Elmo, Ill. In his new connection he returns to the Illinois Basin area, where he formerly was associated with Pioneer Drilling Co. before being transferred to the Rocky Mountain area 3 years ago.

Hood Acquires Workover Company at Hebbronville

Ownership of the G. G. Drilling & Workover Co., Hebbronville, Jim Hogg County, South Texas, has been acquired by the Hood Drilling Co. H. H. Hood, one of the owners of the latter company, has moved to Hebbronville as manager of the newly acquired company.

Mose Wagner, Cut Bank, Mont., is drilling a wildcat test for Carter Oil Co. and Phillips Petroleum Co. on the Fort Peck Indian Reservation in Roosevelt County, northeastern Montana. Hole was drilled with a spudder to 500 ft. Rotary tools now are being moved in for the remainder of the hole, projected to 5,000 ft. Location is in the S½ NW SW 18-29n-50e.

Anschutz Drilling Co., Wichita, is drilling a wildcat test for Harry Gore and associates in northeastern Graham County, western Kansas. Location is on the White lease in 7-6-21. It is 4 miles from nearest production.

Mora Drilling Co., Tulsa, is drilling for Fred T. Haddock at 1 Sellers, a projected 3,200-ft. test in the NW NE SW 19-17n-7e, ½ mile southwest of production in the Cushing field, Creek County, Oklahoma.

Mitchell-Gage Drilling Corp., Oklahoma City, is undertaking a wildcat drilling venture of its own with the starting of a projected 6,100-ft. test

On a rig which Production Service Co., Houston drilling contracting and well-service company, is operating in the drilling play now going on along the east flank of the old Goose Creek field, Harris County, Texas Gulf Coast. Left to right: D. L. Rhodes and D. R. Backel, floormen; A. R. Whitley, derrickman; J. K. Elliott, driller; and W. H. (Red) Manry, toolpusher.

H.C. SMITH ROCK BITS

K-2P.

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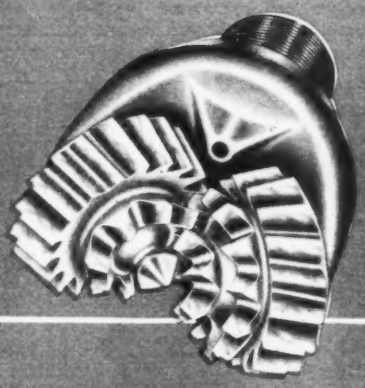

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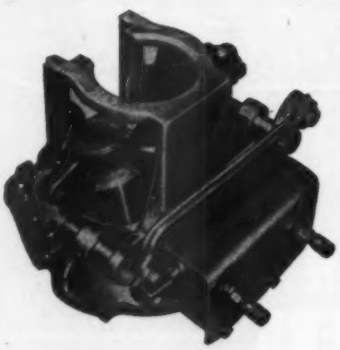

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Long Beach 14, Calif.

3 miles north of Harrah, Oklahoma County, Oklahoma. The test, 1 Laughlin, NE NE SW 12-12n-1e, is 3¼ miles from nearest production, the Jones pool.

Noble Drilling Co., Tulsa, has been awarded the contract and now is moving in a rig to drill a 3,500-ft. Cambrian test on the Spindletop Dome, eastern Fergus County, Montana, for Amerada Petroleum Corp. Location is for 1 Wildin, NE SW NE 27-13n-23e.

Jackson Drilling Co., Wichita, is starting another well for Westgate-Greenland Oil Co. in the Bartholomew pool area, western Sedgwick County, Kansas. The well is 6 Davis, in 31-27-4.

Skeeters & Curry have contracted for a 3,100-ft. wildcat test to be drilled for Rambo and Stephens Oil Co. at 1 Sharp, C S½ NW 25-10s-29w, 5 miles northeast of the Ben Lomand townsite, Sevier County, Arkansas.

N. V. Duncan Drilling Co., Oklahoma City, has moved a rig to an outpost location west of the North Ponca City producing area, Kay County, Oklahoma, where it has a contract for a well to be drilled for John Lindas Oil, Inc. Location for the test, 1 Dunlap, is in the NW NW NW 14-26n-2e.

Lewis Drilling Co., Wichita, is drilling for J. C. Dozier at 1 Finger, 24-19-10, latest test to be started by the latter operator in the Chase area, western Rice County, Kansas.

Delaney Drilling Co., Tulsa, has a contract from Deep Rock Oil Corp. for a 5,300-ft. wildcat test to be drilled southwest of Carney, northwestern Lincoln County, Oklahoma. The test is 1 Johnston, in 2-15n-2e.

Watson Drilling Co. is contracting for Ben Gralapp and associates on a wildcat test being drilled northwest of Arkansas City, southwestern Cowley County, southern Kansas. The test is 1 Palmer, in 22-34-3e.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	Week ended 7-10-50	Change week ended 7-3-50	Change week ended 7-11-49
Gulf Coast	521	— 1	— 9
W. Tex.-N.M.	743	+13	+229
Ark.-N. La.-E. Tex.	144	— 8	— 13
Oklahoma	289	—24	+ 61
Kansas	130	— 5	+ 14
Illinois-Eastern	140	—13	+ 11
Rocky Mountains	103	— 3	— 5
Pacific Coast	133	+ 2	— 44
Total U. S.	2,203	—39	+244
Western Canada	94	+ 7	+ 28
Total	2,297	—32	+272

*Courtesy Hughes Tool Co. Trends in drilling activity for the United States and the West Texas-New Mexico and Oklahoma-Kansas districts are presented by graphs on pages 150 and 151.

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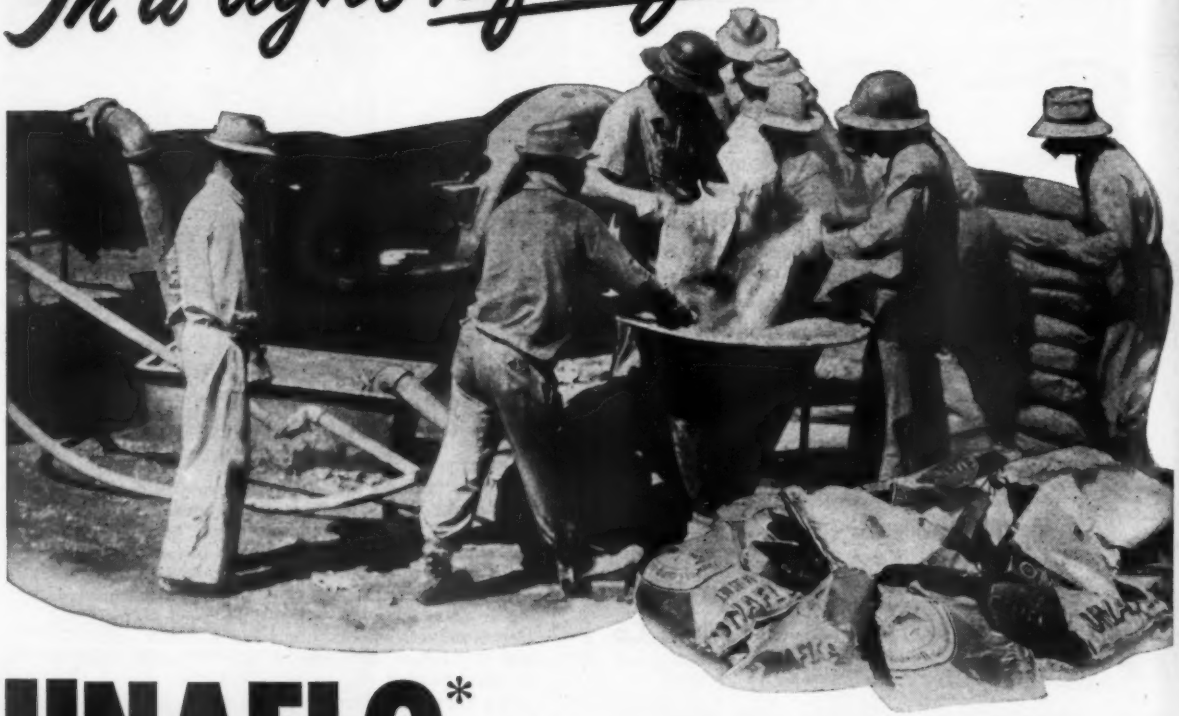

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Exploration and Drilling

Successes in Adams County, Mississippi

IN a flurry of activity, Mississippi operators have brought in six new oil discoveries and one gas-condensate discovery in Adams County during the past 4 months. The full import of this record can not be fully appreciated without noting that during the entire year of 1949, Mississippi's prior record discovery year, there were only five new oil fields and two new gas fields discovered in the whole state. The state's discovery list for 1948 shows only five new fields.

Humble Oil & Refining Co. has accounted for five of the seven successful wildcats. The company's activity has been largely in the area surrounding Ellisle field, a four-well pool, which is located roughly 15 miles south of the city of Natchez. Ellisle field was Adams County's only 1949 discovery. It was discovered by Sohio Petroleum Co. 1 G. W. Armstrong in 36-5n-3w on a gravity and seismic feature. The discovery well was completed May 26, 1949, for an initial of 150 bbl. of 38°-gravity oil per day from 6 ft. of lensing Eocene Wilcox sand. Before the end of 1949, eight more holes had been drilled in the immediate area, five of which were dry.

First discovery in the current flurry was Humble 1 Alberta Robinson, 20-5n-3w, which was completed in March for an initial production of 166 bbl. of 29.1° A.P.I. gravity oil. Completion interval was at 6,406-10 ft. in the Armstrong sand zone of the Wilcox formation. The successful wildcat is 1½ miles north of Ellisle field and opened up what is now called Sibley field.

In April, Humble added two more discoveries to the Adams County total of seven for the year. The first was the 1 Lucy Barksdale, 26-5n-3w, about 1½ miles northwest of Ellisle field. It was finaled for 143 bbl. daily of 41.8° A.P.I. gravity through perforations at 6,571-73 ft. in the Wilcox. The second April discovery for Humble was the 1 C. L. S. McKittrick, 50-7n-3w, which pumped 37.8 bbl. of 27°-gravity oil through perforations at 10,300-20 ft.

Another formal completion announced for the month was the J. D. Reese 1 Armstrong, 19-5n-3w, 5 miles northwest of Ellisle field. It was completed in the Wilcox around 6,588 ft. for 49 bbl. daily of 36° A.P.I. gravity oil. This field has been named Glen Aubin.

Fifth 1950 discovery for Adams County came in May with the Humble 2 Caroline F. Blake, 23-5n-3w, another discovery near Ellisle field. It found production in the Parker zone of the Wilcox formation and was completed at 6,431-35 ft. for 176 bbl. daily of 40° A.P.I. gravity oil.

Humble is also credited with the sixth discovery of the year with the bringing in of a successful wildcat near Natchez. It is the 1 James S. Giles, 4-7n-3w, which opened up North Natchez field by finding gas-condensate below 10,000 ft. Production is from the Lower Tuscaloosa. Initial gage was 730 M.c.f. of gas daily and 92 bbl. of 57.6° condensate.

Latest discovery for Adams County, which brings the 1950 total to seven, is the Plains Production Co. 1 W. C. Walker, 11-5n-2w, which is the discovery well for Kingston field. It is another Wilcox producer with an initial gage of 54 bbl. of 42° oil from perforations at 6,654-56½ ft.

Though there are not enough data available to say whether any of these recent discoveries will open a sizable pool or are more likely to turn out to be other Ellisles, the high discovery rate is in itself significant. The southwest Mississippi Wilcox play has gotten what may prove to be the long-needed run of successes to start a wildcat campaign that will open Wilcox reservoirs comparable to those found in the nearby La Grange fields and at Cranfield. Commercial Wilcox production in Mississippi was first found at Cranfield in 1943 but because of the presence of the more prolific basal Tuscaloosa in the pool there was little attention paid to the Wilcox until 1946 when La Grange field was discovered.

Spurred by the successful wells, four wildcats are currently drilling in Adams County and two were just recently abandoned as dry. Humble is drilling two of the four wells, Kemp Drilling Co. one, and the fourth is being put down by Danciger Refining Co., and William Helis.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—Spartan Drilling Co. 1 Wolcott, League 251, Ward CSL, northwest Martin County wildcat, reported top on the Ellenburger at 12,570 ft., minus datum point of 9,677 ft. This top was correlated 284 ft. high to the Ellenburger at Stanolind's 1 J. E. Mabee, deep failure 8 miles to the north, and 539 ft. high to The Texas Co. 1-X State, prospective Ellenburger discovery 9 miles west. A drill-stem test was being run to 12,630 ft., total depth. Amerada 1 Willard, Terry County discovery, was coring ahead 40 ft. following a drill-stem test at 8,450-8,507 ft. which flowed 144 bbl. of oil to tanks in 4 hours. Anderson-Prichard 1 Bevers rated a daily potential of 2,280 bbl. of oil on completion test, to open a new prolific Pennsylvanian reef field in Terry County.

ROCKY MOUNTAIN AREA.—Far West Oil Co. and Hancock Oil Co. found oil on tests in the Dakota formation at the 1 State, South Glenrock, Wyoming, wildcat. Trigood Oil Co. 1 Gouch has plugged back for completion as a Dakota discovery in the Merino area, Colorado. North Dakota activity increases with two new wildcats starting.

CALIFORNIA.—The MacDonald Anticline area in western San Joaquin Valley has had a substantial extension or a new discovery. Glenn Ferguson and I. W. Bosworth 2 Layman, 18-28s-20e, initialed 500 bbl. daily through ¼-in. choke from the Buttonbed sand topped at 1,977 ft.

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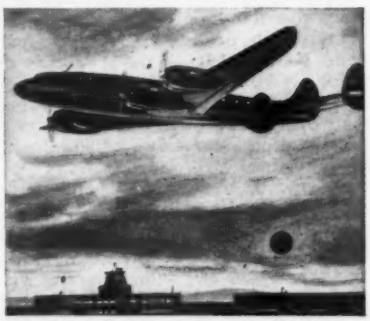

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Good Gas Sand Found in Osceola County Wildcat

MOUNT PLEASANT.—I. W. Hartman logged an estimated 8 to 10 million cubic feet Stray sand gas play at his 1 Manley, SE NE SE 33-17n-7w, Orient Township wildcat, Osceola County at 1,334-39 and 1,440-41 ft. Top of Stray was logged at 1,432 ft. and gas started to show in 30 seconds on drill-stem test, but no gage was taken.

A micro-log and permeability survey of the Stray sand-dolomite section showed as much as 10 ft. of good gas sand between 1,434-52 ft. However, operator elected to set 7-in. casing at 1,785 ft., standardize and drill to the Dundee-Reed City zone objectives to fulfill original commitments before testing the gas sand further.

The Orient wildcat is located about a mile northeast of the Fork Dundee oil and Stray gas pools, Mecosta County. This well was reported to be checking in structurally favorable on upper markers in comparison with the older field to the southeast and other control points in the area.

Another Osceola County wildcat carried an interesting oil and gas show in the Traverse at midweek but before the first day was over operator had ordered contractor to drill ahead towards the Dundee-Reed City zone objective.

Granville C. Berlin logged about 200 ft. of free oil and an estimated 100,000 cu. ft. of gas in the Traverse lime at 3,554-56 ft. Top of lime logged at 3,549 ft. However, after a bail-down test, water was showing at the rate of a bailer an hour and oil-gas show appeared to have nearly exhausted. Well was being drilled with cable tools below 3,564 ft. toward the next objective.

The Lands Division, Michigan Department of Conservation, leased 29,565 acres of state-owned lands for oil and gas development at a public auction at Lansing, July 7, for a total bonus bid of $28,354.

There were 38,805 acres of wildcat leases offered for sale of which 28,576 acres brought a total bid of $24,824, an average of $0.83 per acre. Two 40-acre tracts, classified as proven and subject to a sliding-scale override, were leased for a bonus of $3,530. One of these proven tracts was in Butman Richfield pool, Gladwin County, and the other was in St. Helen Richfield pool, Roscommon County.

Brazos Oil & Gas Co. was the largest single buyer at the sale, bidding in 13,736 acres for which it paid $15,908.

MICHIGAN WILDCAT FAILURES

Allegan County, Monterey Township: Eric P. Schelling 1 Brenner, NW NW SE 12-3n-13w, dry in Coldwater Red Rock, TD 1,040 ft.

Saugatuck Township: Harry Boor 1 Fleming, SE SW NW 35-3n-13w, Traverse lime 1,350 ft., dry, TD 1,361 ft.

Bay County, Frasier Township: Ray M. Whyte and W. P. Whyte 1 Sowa, NW NW NE 4-16n-4e, Dundee 2,868 ft., dry, TD 3,097 ft.

Lake County, Yates Township: Harry E. Roberts A-1 State, N½ SW SE 21-17n-12w, Dundee 3,314 ft., dry, TD 3,499 ft.

Mecosta County, Wheatland Township: The Moco 1 Minkel, NW NE NW 18-14n-7w, Dundee 3,690 ft., dry, TD 3,697 ft.

Missaukee County, Riverside Township: Michigan Oil Co. and Americrude Oil Co. 1 Diemer 24-21n-7w, Dundee 3,911 ft., dry, TD 3,920 ft.

Newaygo County, Denver Township: R. G. Smith 1 Canniff, NW NE SW 34-14n-14w, Traverse 2,285 ft., dry, TD 2,290 ft.

Oceana County, Shelby Township: Mercer Oil Co., Inc. 1 Spooner, NW NW NE 27-14n-17w, Dundee 2,537 ft., dry, TD 2,564 ft.

Wexford County, Henderson Township: Sun Oil Co. A-1 State-Henderson, SE SW NE 23-21n-11w, dry in Detroit River series, TD 5,130 ft.

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Permian Basin

Discoveries Probable for Two Terry County Wells

MIDLAND. — While one Terry County wildcat made completion tests from the Pennsylvanian reef, another prolific discovery was in the making, from what has been tentatively identified as the Wolfcamp of the lower Permian.

Anderson-Prichard Oil Corp. 1 H. C. Bevers, NE NE 39-DD-John H. Gibson Survey, about 3 miles southeast of Wellman, rated a daily potential of 2,280 bbl. of 42.5°-gravity oil. Production was without acid, and through 1-in. opening on tubing, from perforations in casing at 9,712-26, 9,734-92 and 9,795-9,805 ft. Total depth was 9,811 ft. and 5½-in. casing was set on bottom. Shakeout was two-tenths of 1 per cent drilling fluid. There was no formation water. Top of the producing section was 9,705 ft., or minus 6,428 ft.

Potential of the 1 Bevers was based on a 6-hour flowing test of 572.5 bbl. Gas-oil ratio was 470 cu. ft., and flowing tubing pressure was 175 psi. during the first hour, and 190 psi. during the balance of the period.

The new prospector is Amerada Petroleum Corp. 1 N. W. Willard, NE NW 6-C37-PSL, about 6 miles southeast of the Bevers well, just north of the south Terry County line and a mile or so west of San Andres production in Adair field.

First production was developed in the 1 Willard on a 5-hour drill-stem test in limestone from 8,450-8,507 ft. Gas came to the surface in 5 minutes and oil in 38. It was flowed into pits for 27 minutes then turned into tanks where it gaged 144 bbl. of 43°-gravity oil in 4 hours, flowing through ¾-in. bottom-hole choke and 1-in. top opening. Gas-oil ratio was 430 cu. ft. Flowing pressure was 2,420 psi. and shut-in bottom-hole pressure registered 3,339 psi. in 15 minutes.

Drill pipe unloaded most of the way out and recovery was 175 ft. of oil plus 3 ft. of water. The Sprayberry section of the Permian in the 1 Willard was placed at 7,270 ft., or minus 4,035 ft., which was correlated 272 ft. high to the same section in the 1 Bevers. Data on lower formations had not been determined.

Possibility of a new reef structure between the Von Roeder and North Vincent fields of southeastern Borden County was seen at P. R. Rutherford and Heep Oil Corp. 1 John Gilmer Davis, located 467 ft. out of the northeast corner of 68-25-H&TC. The new prospector topped the reef at 6,768 ft., or minus 4,516 ft. That top places it 65 ft. low to Amerada Petroleum Corp. 1 Weathers, most southerly producer in Von Roeder field, 2½ miles to the northeast. The marker was also reported 89 ft. high to Rutherford 1 P. L. Griffin, northeast definition well in North Vincent field, which is 1 mile south of the new test.

After topping the reef at 6,768 ft., operators drilled ahead 13 ft. and ran a 12-minute drill-stem test at 6,744-81 ft. Gas showed in 5 minutes, and oil in 6 minutes. During the following 6 minutes it flowed at an estimated rate of 50 bbl. of oil an hour. At last report operators were pulling the testing tool. Top on the reef was said to be 19 ft. below the water level as found in Von Roeder field.

In northeast Howard County, George Brown 1 Branon, SW SW 18-27-H&TC, discovery or southeast extension to East Vealmoor field, was to drill ahead 25 ft. for additional tests, according to some field sources. The well had flowing oil on a 30-minute drill-stem test at 7,360-86 ft. On the test, gas showed in 3 minutes, mud in 12 minutes, and oil in 13 minutes. It flowed an estimated 25-35 bbl. of oil an hour for the next 17 minutes. There was no water on the test. Top of the pay section had been tentatively set at 7,300 ft., or minus 4,763 ft.

The 1 Branon is 1½ miles south and ⅛ mile east of Sunray 3 Wilson, south offset to the 1 Wilson, discovery of East Vealmoor field. North and south offsets had been staked to the 1 Branon. Amcan Oil Corp. and Southland Royalty Co. staked 1-18 Branon in NW SW 18-27-H&TC, a north offset, and Amcan located its 1-19 Branon in NW NW Section 19, south offset to the discovery. George Brown's 2 Branon will be ½ mile east of the discovery, in SW SE 18-27-H&TC. All of the new tests were projected to 7,400 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Kent County: Kewanee Oil Co. 1-C Wilson Connell, SW SE 3-4-H&GN, 4 mi. E Polar field, TD 6,880 ft., elev. 2,219 ft., Pennsylvanian lime 6,850 ft., pay 6,855 ft., flowed 328.3 bbl. of 38°-gravity oil a day, ¼-in. choke, GOR 395 cu. ft., TP 100 psi., perf. 6,853-70 ft.

Midland County: Magnolia Petroleum Co. 2 Roy Parks, NW NW 10-M. C. Daugherty Sur. 10, 11½ mi. SW Midland, TD 12,970 ft., elev. 2,835 ft., Ellenburger pay 12,955-970 ft., flowed 785 bbl. of 54°-gravity oil a day, natural, ¼-in. choke, GOR 1,099 cu. ft., CP 750-875 psi., TP 1,500-1,600 psi.

Runnels County: Robinson-Puckett, Inc. 1 S. H. Davidson, SW SW NW 85-64-CTRR Sur., 3 mi. NW Winters, TD 5,055 ft., PB 3,845 ft., elev. 1,908 ft., Palo Pinto 3,770 ft., pay 3,828 ft., pumped 8 bbl. of 45°-gravity oil a day, some water, perf. 3,828-33 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Amerada Petroleum Corp. 4 March Ranch, NE NE 72-16-H&TC, dry, TD 822 ft. in shale and dolomite.

Garza County: L. F. Long 1 G. W. Bassinger, SW SW SW Sec. 1303, A-290, D&SE Sur., 6 mi. SE Southland, 1½ mi. E

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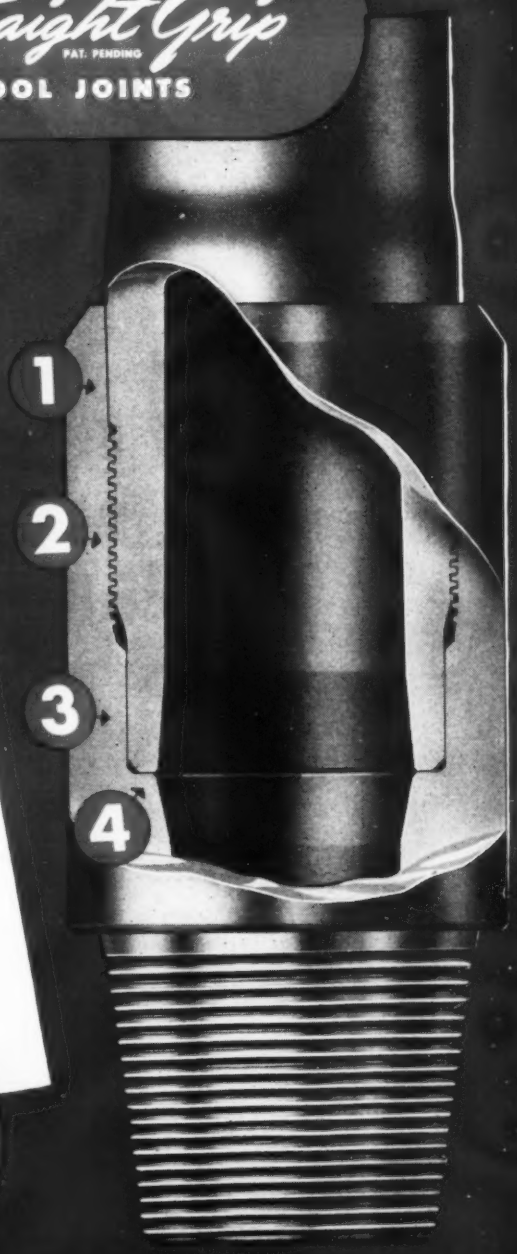

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Santa Fe

Buenos field, dry, TD 3,470 ft., elev. 2,679 ft.

Kent County: Drilling & Exploration Co., Inc. 1-A Wilson Connell, SE SE NW 18-5-H&GN, ¾ mi. NW San Andres discovery, dry, TD 2,271 ft., elev. 2,259 ft.

Kimble County: R. F. Schoolfield 2 George F. Rust, BS&F Sur. 42, 20 mi. NW Junction, dry, TD 2,205 ft.

Runnels County: Gulf Shore Oil Co. 1 Ollie Davidson, H. E. Baggs Sur. 100, 1½ mi. N Lloyd field, dry, TD 5,601 ft., Gunsight 3,077 ft., Palo Pinto 4,064 ft., upper Fry 4,404 ft., lower Fry 4,472 ft., Caddo 5,054 ft., Ellenburger 5,262 ft.

North South Oil Co. 1 Bennie Mae Smith, Sec. 1, Brooks & Burleson Sur., 2½ mi. W Goldsboro, 1 mi. NE Aldridge field, dry, TD 4,550 ft., Caddo 4,120 ft.

Scurry County: Standard-Fryer Drilling Co. 1 I. G. Harrell, NW NW 81-2-H&TC, 8 mi. NE Snyder, dry, TD 7,640 ft., elev. 2,321 ft., Ellenburger 7,464 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Eddy County: Parker & Parker 1 B. F. Kaiser, 20-18s-27e, 2 mi. E Dayton field, dry, TD 1,948 ft., elev. 3,290 ft., Red sand 635 ft., Grayburg 1,030 ft., San Andres 1,386 ft.

Southwest Texas

Wildcat Near London Gin Field Tests 20.3 Bbl. Daily

CORPUS CHRISTI.—A potential gage has been run on the Train-Weisman 1 Ed Jurica Estate, an oil discovery 3½ miles southwest of Corpus Christi and 3 miles north of London Gin field, Nueces County. The test was drilled to a total depth of 4,856 ft. and 5½-in. pipe set at 4,757 ft. Test was completed for 20.3 bbl. of 37°-gravity oil daily on the pump from perforations at 4,732-38 ft.

Sunray Oil Corp. has staked location for its 1 Marshall Brothers, a 9,800-ft. wildcat test 10 miles northeast of Oilton, Webb County. It is on a 640-acre lease in Survey 584.

Harvey J. Wier & Sons and Frank Stratton are starting a wildcat 24 miles south of Sonora in Val Verde County. It is the 1 Guida Rose, GC&SF Survey, Section 2, with a scheduled depth of 10,500 ft.

Skelly Oil Co. will drill a 6,400-ft. wildcat 4½ miles north of Edroy in San Patricio County. It is the 1 H. A. Adams, Section 40, George H. Paul Subdivision.

Sid Katz et al are testing gas through perforations at 3,204-15 ft in their 3 W. R. Peters, a wildcat in Duval County. Operators drilled to 3,539 ft. and set casing. The test is located on a 1,216-acre lease in the GB&CNGRR Survey 37, Abstract 722, 13 miles south of Freer.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Nueces County: Gas condensate discovery—Atlantic Refining Co. A-1 W. F. L. Lehman, Ramon de Ynojosa Sur. A-411, ½ mi. southwest Corpus Christi, TD 11,005 ft., perf. 9,630-45 ft. and 9,655-715 ft., IP 2,360 M.c.f. gas daily, GOR 14,800-1.

San Patricio County: Gas condensate discovery—Plymouth Oil Co., R. H. Welder Ranch Subd., 6 mi. northeast of Sinton, TD 8,279 ft., perf. 65 shots at 6,994-7,005 ft., 202 M.c.f. gas daily, GOR 43,348 to 1.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Brooks County: Hawn Bros. 1 Dr. Jose G. Garcia, La Encantada Grant, 1½ mi. west of Rachal, dry, TD 7,020 ft.

Duval County: Bridwell Oil Co. 3 Rosa V. de Benavides, Cole Petroleum Co. Subd., M. Arispe Grant, 4 mi. east of Bruni, dry, TD 1,723 ft.

Guadalupe County: B. R. Smith and Hugh

Nichols 1 Tom Anderson, Green DeWitt Sur. 11, 8 mi. east of Seguin, dry, TD 2,313 ft.

San Patricio County: H. H. Howell 1 H. H. Howell, Summers Subdivision of Delgado Grant, dry, TD 5,470 ft.

Travis County: H. F. Goff 1 Edgar Nagle, Lemuel Kimbro Sur., dry, TD 825 ft.

Webb County: Killam & Hurd, Inc. et al 1 J. O. Walker, Sur. 1011, 4 mi. north of Oilton, dry, TD 2,583 ft.

Rocky Mountain

South Glenrock Wildcat Is Commercial Producer

DENVER.—Confirming a commercial producer in its wildcat in the South Glenrock area, Far West Oil Co. of San Antonio and Hancock Oil Co. of Los Angeles this week tested oil in the top of the Dakota formation at 1 State 7, SW SW SE 7-33n-75w, 2 miles south of Glenrock field, Converse County, Wyoming.

The well topped Dakota at around 5,850 ft. and on 45-minute drill-stem test between 5,859-5,864 ft. the well made 1,170 ft. of oil and 450 ft. of oil-cut mud. The oil was 32.8°-gravity (uncorrected). This well also made oil on drill-stem test, with the well flowing in 14 minutes, from the Muddy sand between 5,671-5,683 ft. The well is east of Big Muddy field, where there has been Dakota sand production for many years. In addition to Far West and Hancock, Continental Oil Co., Southern Production Co., and J. G. Dyer of Denver have holdings in this immediate area. A part of the original Far West-Hancock block was farmed out from Continental.

Trigood Oil Co. is near completion on its discovery in the Merino area at 1 Gouch, SE SE SE 19-6n-54w, Logan County, Colorado. The well was drilled into Lakota and plugged back for completion in the Dakota sand. On drill-stem test 5,105-5,120 ft., open 1 hour, the recovery was 3,650 ft. of fluid of which 2,840 ft. was oil and gas with a trace of water and 810 ft. of water. Top of Dakota was found at 5,090 ft. and the zone tested oil on drilling. The operator has plugged back to 5,120 ft. and has run casing for completion. This is the second Dakota sand discovery in northeastern Colorado following the wildcat play through this area. There have now been a total of six new pools discovered in the Denver-Julesburg Basin area of northeastern Colorado and western Nebraska, following the initial discovery by Ohio Oil Co. in Gurley pool, northeast of the town of Sidney, Neb. The present Trigood well is located on a block farmed out by Ohio, and on which seismic work has been completed.

There has been considerable interest in the F. F. Kelly (Plymouth Oil Co.) wildcat in the Medicine Buttes area at 1 Fritz Leutz, C NW NE 28-142n-89w, Mercer County, North Dakota. The well is now reported drilling below 6,600 ft. with no tops nor tests reported. The well is scheduled as a test to Devonian at around 9,000 ft. and will be the first in the West-Central North Dakota area to test that formation. J. P. Evans of Shreveport, La., plans to test in the Linton area, Emmons County, and Noble Drilling Co. is reported drilling in the Turkey Creek area, McLean County. Approximately ten million acres of land are now leased through the Williston Basin of North and South Dakota, and several additional wildcats are expected through the area in the near future. Recently the California Co. completed a deal with Stanolind Oil & Gas Co. for a one-half interest in Stanolind lands through Burke, Benville, Ward, and Mountrail counties, in the north-central part of the state. California will do geophysical work on the area, with joint decision and participation on a possible later drilling campaign.

WYOMING WILDCAT FAILURES

South Big Muddy, Converse County: L. W. Winkler & Son 1 State-Peterson, 2310 S/N-330 W/E Tract, 55, Sec. 10-32-77w; 4,942 TD; plugged and abandoned; Wall Creek 3,510, Dakota 4,786, Lakota 4,862, Morrison 4,915.

Prickly Pear, Crook County: Amerada Petroleum Corp. 2 Unit, C SW SE 6-57n-66w; 1,678 TD; plugged and abandoned, Mowry 823, Newcastle 1,031, Dakota 1,353, Fuson 1,510, Lakota 1,570, Morrison 1,637.

North Salt Wells, Sweetwater County: Robertson & Nielson 1 Govt., SW SW SE 31-15n-103w; 900 TD; plugged and abandoned.

COLORADO SUCCESSFUL WILDCAT

Armstrong, Logan County: British-American-Plains Expl. et al 1 H. Segelke, NE NW NE 26-11n-53w, 5,800 TD; PB 5,448; pumped 58 bbl. oil per day, 30 bbl. water per day on 16-day test; 7-in. at 5,775; Niobrara 4,464, Fort Hayes 4,720, Carlisle 4,796, Greenhorn 4,980, Graneros 5,028, "D" sand 5,238, gas 5,262, "J" sand 5,356, oil 5,408, "M" sand missing; "O" sand 5,608, "R" sand missing, "T" sand 5,720, Morrison 5,780.

COLORADO WILDCAT FAILURE

Winston, Logan County: British-American-Plains Expl. 1 Thomas, SE NW SE 13-11n-53w; 5780 TD; plugged and abandoned; Ft. Hayes 4,701, Carlisle 4,777, Greenhorn 4,968, "D" sand 5,232, Basal "D" sand 5,256, "J" sand 5,350, Basal "J" sand 5,401, "O" sand 5,595, "R" sand 5,628, "T" sand 5,713, Morrison 5,768.

MONTANA WILDCAT FAILURE

Battrick Structure, Fergus County: W. M. Hanlon 1 Woodworth, NW SW SE 32-14n-24e, 2,725 TD; temporarily abandoned;; Morrison 90, Ellis 338, Amsden 485, Heath 645, Otter 1,285, Kibbey 1,708, Charles 1,970, Madison 2,590.

NEBRASKA WILDCAT FAILURE

Gandy area, Logan County: Cope Associ-

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ates 1 State, CSE¼ 36-18n-28w; 3,450 TD; plugged and abandoned; Chugwater 2,636, anhydrite 2,926.

Louisiana-Arkansas

Smackover Wildcat Tests Series of Core Showings

SHREVEPORT.—Marine Oil Co. 1 Trigg, Smackover wildcat 6 miles northeast of Urbana field, in NW NE 33-17s-12w, Union County, Arkansas, had total depth at 6,158 ft., ran electrical surveys, and was testing back up the hole. Top on the deeper formation had not been reported. There were shows of oil in limestone cored from 6,117 ft. to total depth, but the sections apparently were not tested.

Side-wall cores recovered sand with oil show at 4,181, 4,285, 4,292, 5,892, 5,895, and 5,898 ft. Casing was set at 5,953 ft. and perforated between 5,881-91 ft. On test, it swabbed salt water with a slight show of oil. Other perforations and results were: From 4,769-73 ft. recovery was salt water with light oil show; from 4,422-32 ft. recovery was salt water and gas-cut mud. Operators prepared to reperforate the latter section. Top of the Cotton Valley was 4,006 ft., on elevation of 164 ft.

In the new Tubal field of Columbia County, C. H. Murphy 1 Concannon, SE NE 29-19s-18w, northwest offset to the discovery, was drilling in the Travis Peak at 7,211 ft.

The same operator's 1 Emon, NW NE 20-18s-18w, Columbia County wildcat, was in the Cotton Valley at 5,956 ft., and drilling ahead at 6,744 ft.

In Miller County, 12 miles northeast of Texarkana, C. A. Mohnkern 1 Chas. Ross, 15-14s-27w, was drilling below 5,303 ft., in the Buckner zone topped at 5,280 ft. by samples. The well is being deepened from old total depth of 4,007 ft. Elevation is 266 ft.

In Ouachita County, J. S. Rushing 1 Camden Coal & Clay Co., 15-12s-18w, was drilling ahead at 4,615 ft.

Marine Oil Co. had location staked for its 1 Whited, NE NE NE 1-18s-13w, in Union County, 2 miles northeast of the Urbana field. Location for the 6,200-ft. wildcat was on a seismic and subsurface prospect.

H. J. Strief 2 W. S. Peck, Tuscaloosa wildcat in irregular Section 42-10n-8e, Catahoula Parish, was drilling at 6,214 ft. in the upper Cretaceous, following 53 side-wall cores in the Wilcox from 3,246-5,113 ft.

Continental Oil Co. 1 Wideman, NW SE 21-21n-7w, Claiborne Parish, was running surveys to 6,190 ft., in the Cotton Valley formation topped at 5,820 ft., on elevation of 299 ft. A core from 6,130-40 ft. recovered 10 ft. of sandy limestone with a show of dead oil, and a drill-stem test with packer at 6,032 ft. recovered 660 ft. of salt water with a light oil show, in 30 minutes.

Sterling Oil & Gas Co. 1 Rambin, 20-11n-11w, DeSoto Parish wildcat, recovered salt water on a drill-stem test in the Rodessa at 5,198-5,213 ft. Drilling continued at 5,320 ft., in the lower Glen Rose.

The Isbrandtsen Co. of Louisiana, Inc. and Baruch, Nettune & Co., Inc. have completed four gas-condensate wells from the Kilpatrick sand on their 4,000-acre lease in the Capitan area, located in 15n-12w, Caddo and DeSoto parishes. Two wells are drilling. This is the first producing operation for Isbrandtsen, wholly-owned subsidiary of the Isbrandtsen Steamship Co., New York.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Tensas Parish: David M. Lide 1 State-Harris Unit, approximately NW NE 40-12n-12e, TD 8,910 ft., perf. 8,897-8,907 ft. in basal sand, flowed 100 bbl. of 59.6°-gravity distillate per day, ⅛-in. choke, GOR 5,320 cu. ft., TP 2,500 psi.

NORTH LOUISIANA WILDCAT FAILURES

Red River Parish: G. M. LeGrand 1 Kennedy Saw Mill, 12-14n-12w, dry, TD 1,764 ft., Buckrange 1,721 ft., had light oil show and salt water.

Tensas Parish: Caddo Oil Co. 1 Harrison Miller, SW NE 19-10n-10e, dry, TD 6,306 ft., elev. 73 ft., Wilcox 3,284 ft., cut 45 sidewall cores in Wilcox, no shows.

ARKANSAS SUCCESSFUL WILDCATS

Ouachita County: Magnolia Petroleum Co. 1 Lester "B," 31-14s-19w, TD 2,208 ft., elev. 264 ft., perf. 2,142-47 ft. in Blossom sand, pumped 89 bbl. of 28°-gravity oil a day.

Union County: Second well and new pay in Catesville field—C. H. Murphy 2 Sue Olson, NE NW NE 32-18s-15w, TD 7,779 ft., perf. 7,718-20 ft. in Smackover, flowed 116 bbl. of 43.6°-gravity oil a day, ⅛-in. choke, TP 1,900 psi.

ARKANSAS WILDCAT FAILURES

Ouachita County: Don D. Montgomery 1 H. L. Berg, SW SW NE 13-15s-17w, dry, TD 2,800 ft., elev. 184 ft., Arkadelphia 1,983 ft., Saratoga 2,290 ft., Annona 2,500-32 ft., Meakin 2,533 ft., Graves 2,640 ft.

Union County: Pioneer Drilling Co. 2 W. E. Baker, SW NW SW 23-16s-14w, dry, TD 2,664 ft.

Ohio Fields

Gas Discoveries Found In Clinton and Trenton

COLUMBUS.—R. B. Weed et al deepened their 1 Geo. M. Jones, Section 33, Harrison Township, Perry County, from 16 ft. in the Clinton to 3,624 ft. The gas increased to an estimated 2,000,000 cu. ft. and the hole filled 1,200 ft. with oil. After shooting with 120 qt., 40 bbl. was swabbed out in 24

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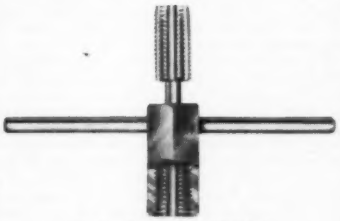

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hours, but the well did not flow on account of a bridge or obstruction. Sheffield Oil Co. 5 J. L. Swingle, Section 9, Harrison Township, found the Clinton at 3,464-3,514 ft., making 34 bbl. in 24 hours after a 120-qt. shot.

Homer Leininger 1 Homer Failer, Section 33, Crane Township, Wyandot County, topped the Trenton at 1,337 ft. and after an 80-qt. shot made 65 bbl. and 300,000 cu. ft. gas.

Charles Alloway 1 Noah Ward, Section 5, Grandview Township, Washington County, topped Salt sand at 1,193 ft. and finished at 1,199 ft. with 1,000,000 cu. ft. natural.

Hanley & Bird are drilling a wildcat test on H. H. Johnson, Lot 17, New London Township, Huron County, and expect to go to the Cambrian unless production is found in the Trenton or Saint Peter.

Locations reported for the week totaled 21 from 13 counties while completions totaled 25.

Texas Gulf Coast

Housh Rigging Up for Third Tyler County Well

HOUSTON.—C. N. Housh, Houston independent, is rigging up on 2 Charles Kieke, his third well in the Tyler County field which he discovered early in May and which was named after him this past week. American Republics Corp. and Houston Oil Co. have also announced that they will drill an offset to the discovery well which was the 1 Charles Kieke, BBB&C Survey, 330 ft. from the south line and 330 ft. from the west line. It was completed in the Wilcox between 8,376-84 ft. for 181.5 bbl. daily of 42°-gravity oil through 9/64-in. choke. Two successful and one unsuccessful offset have been drilled since the discovery well was brought in.

Continental Oil Co. has brought in a shallow oiler in Fayette County, 5 miles north of Flatonio. It is the 1 Stinehauser, Weaver Survey, A-335, which was completed on the pump for 66 bbl. of 21.2°-gravity from open hole in the interval 2,317-26 ft.

Sun Oil Co. has staked location for a deep wildcat test in Waller County 12 miles northeast of Hempstead. It will be 1 Corinne Connel with location on a 395-acre lease, David Scott Survey. Proposed depth is 11,000 ft. Sun drilled a dry hole, the Von Blucher, to the west of this location in 1949. It was abandoned as dry only after considerable testing and reaching a total depth of below 11,000 ft.

Meredith, Clegg & Hunt et al have apparently opened a deep gas-condensate field in Jefferson County, 1 mile southwest of Hamshire. Test is the 1 Earl Hankamer, et al, T&NO Survey, Section 136, which flowed gas from open hole from 12,607-70 ft. Flowing pressure was 4,000 psi. on ¼-in. choke. Total depth is 12,800 ft. and plugged back depth is 12,670 ft.

Magnolia Petroleum Co. has staked a 9,500-ft. test 3 miles north of Terry, Orange County. It is the company's 1 Oscar Chesson, I&GN Survey 5, A-115.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Fayette County: Oil discovery—Continental Oil Co. 1 Alfred F. Stinehauser, 5 miles north of Flatonia, 100-acre lease, Almon Weaver A-335, TD 2,326 ft., 66 bbl. 21.2°-gravity oil from perf. 2,317-26 ft.

Liberty County: New oil pay—Texas State Drilling Co. 4 Deussen, David Minchey Survey, TD 3,622 ft., top pay 3,396 ft., perf. 3,396-406 ft., 114.83 bbl. daily on ⅛-in. choke, 22° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: James R. Dougherty 1 Sterling F. Dugat et al, F. B. Malone Sur. A-527, 3½ mi. northwest of Mineral, dry, TD 7,550 ft.

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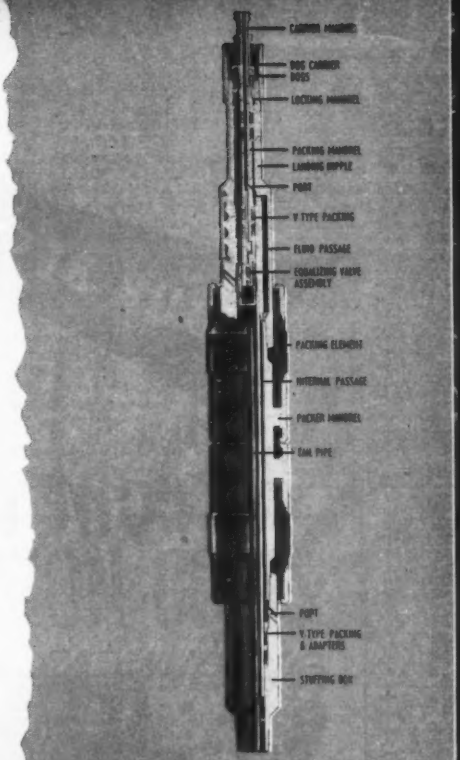

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Calhoun County: Brazos O. & G. Co. 6 Powder Horn Co., Juan Cano Sur., 1½ mi. E-NE Powder Horn field, dry, TD 5,775 ft.

DeWitt County: The Texas Co. 1 Alfred Friar, SA&MGRR Co. Sur. 9, A-445, 9 mi. east of Cuero, dry, TD 9,022 ft.

Galveston County: John W. Mecom 1 Halls Bayou Ranch, Lindsey T. Yowell Sur. A-215, 6 mi. south of Hitchcock, dry, TD 7,150 ft.

Karnes County: W. W. Carter et al 1 Della B. Tips, Carlos Martinez Sur., 2½ mi. west of Runge field, dry, TD 3,536 ft.

Wharton County: Kirby Petroleum Co. 2 Nora Dagley, S. F. Austin 3 1/6 League, dry, TD 2,668 ft.

California

MacDonald Anticline Gets Big Discovery

LOS ANGELES.—The MacDonald anticline area in western San Joaquin Valley has been given either a substantial extension or a new discovery. As the new venture falls about 6 miles south of Shell Oil Co.'s recent discovery in the Antelope Hills region, this gives the area two discoveries in less than 6 weeks. Unlike Shell's strike, which produced 15°-gravity crude, the McDonald anticline well flowed 30°-gravity oil.

The successful test was Glenn Ferguson and I. W. Bosworth 2 Layman, located in Section 18-28s-20e, 1 mile southeast of other production. Initial production was at the rate of 500 bbl. daily, 0.5 per cent cut, through a ¼-in. choke. The pay zone is the Buttonbed oil sand, topped at 1,977 ft. Production is through 80 ft. of perforated 5-in. liner landed at 2,057 ft., total depth.

In Northwestern Cuyama, Seaboard Oil Co. 1 K. C. Wallace on the Spanish Ranch, Section 12-11n-30w, about 9 miles west of Russell Ranch production, was dry at 3,695 ft. in the Cretaceous.

Another disappointment in the same area was a setback to prospects for the Superior pool of Morales field. Scouts reported that Superior Oil Co. had installed pumping equipment at its 17-2 U. S. Government, north offset to the 18-2 discovery well. The new well with total depth at 6,435 ft., is a tight hole, and the company has released but little information on the discovery other than total depth and initial production—6,126 ft. and 450 bbl. daily.

Continental Oil Co. is scheduled to start a test on its properties in the Sierra Moreno anticline area of San Mateo County in the very near future. Location for its 1 Bainchi has been staked in Section 17-6s-4w, 10 miles south of Redwood city and near the west edge of the San Andreas fault. Continental holds about 9,000 acres in this area. Hancock Oil Co., The Texas Co., Richfield Oil Corp., and other companies likewise have extensive leases in this general vicinity.

A second test for the Ciervo anticline area of San Benito County has been staked by Ciervo Oil Corp. in Section 28-16s-12e. The test is a northeast offset to the 1 Nicholas, completed as a discovery by The Texas Co. in July 1948 for 18 bbl. daily of 24.8°-gravity crude at the plugged-back depth of 1,185 ft.

Standard Oil Co. of California is slated to drill a 4,000-ft. test to the basement in the Comanche Point area of Kern County, about 3 miles northwest of Tejon Hills field. In the Sargent area of San Benito County, Jack Herley and other independents are grading road to their 1 O'Connell in Section 4-12s-4e.

CALIFORNIA WILDCAT FAILURES

Fresno County, West Coalinga area: North Coalinga Oil Co. 1 "Well," 25-19s-14e, dry, TD 805 ft., elev. unknown.

Kern County: Antelope Hills area: Palomar Oil Co. 1 Palomar-Voight, 6-28s-20e, dry,

TD 2,271 ft. (encountered fault), elev. 852 ft.

Tejon Hills area: L. C. Gould 3-1 Gould, 3-11n-18w, dry, TD 1,407 ft. (encountered basement), elev. 895 ft.

West Edison area: Macson Oil Co. 2 Oasis Ranch, 7-30s-29e, dry, Jeppi zone 3,250 ft., Santa Margarita 3,445 ft., TD 3,484 ft., elev. 475 ft.

Los Angeles County, South Puente area: H. H. McVicar 1 Rowland est., 20-2s-10w, dry, TD 3,523 ft., elev. 506 ft.

San Benito County, Hollister area: Richfield Oil Corp. 1 Ollason, 8-13s-5e, dry, TD 8,491 ft., elev. 461 ft.

San Luis Obispo County: Northwest Cuyama Valley area: Northwest Cuyama Oil Co. 1 U. S., 27-32s-19e, dry, TD 2,612 ft., elev. 2,550 ft.

Santa Barbara County: West Cuyama Valley area: Seaboard Oil Co. 1 K. C. Wallace, 12-11n-30w, dry, TD 3,695 ft. in Cretaceous, elev. 1,981 ft.

Goleta area: Revo Oil Co. 1 Revo, 3-4n-29w, dry, TD 1,490 ft., elev. 225 ft.

Yolo County, South Pleasant Creek area: Shell Oil Co. and Natural Gas Corp. 1 Stone, 16-8n-1w, dry, TD 5,200 ft., elev. 141 ft.

CALIFORNIA SUCCESSFUL WILDCAT

Ventura County, Ventura Avenue area: Lloyd Corp. 1 Sexton, 19-3n-22w, flowed estimated 500 bbl. per day of 32°-gravity crude, perf. 12,602-13,448 ft., TD 13,450 ft., elev. 953 ft., either extends Ventura Avenue D-7 zone production 1 mile east, or discovers new pool.

South Louisiana

Wilcox Discovery Seen In Rapides Parish Test

NEW ORLEANS.—Indications are that Texas Pacific Coal & Oil Co. will open up a new Wilcox field in the southern part of Rapides Parish with its 1 W. W. Elliott, C NW SW 35-1s-2w, 4 miles southeast of Glenmore townsite.

A 5-minute drill-stem test at 10,436-441 ft. with ¼-in. top and bottom chokes got a recovery of 2,750 ft. of high gravity oil with no water. When the well was cored ahead, additional oil sand was found at 10,441-452 ft. An additional 13½ ft. of oil-saturated sand was found at various intervals in going down to 10,517 ft. Last reported depth was 10,614 ft.

Thomas Jordan, Inc., has opened a new pay in the Napoleonville field, Assumption Parish, with its 1 Kessler-Sternfels, 33-12s-13e. The well flowed 2,670 M.c.f. of gas daily and 48 bbl. of 50.8°-gravity condensate through ½-in. tubing choke. Production was from perforations at 8,820-36 ft.

Offshore, Shell Oil Co. completed its third, and best yet, well in its new field in the South Pass area off Plaquemines Parish. The test was State Lease 998 No. 1 and flowed 305 bbl. of oil daily on a drill-stem test through a 9/64-in. choke.

Bateman Drilling Co. 1 J. M. Wilson Estate, 51-5s-8e, 3½ miles northwest of Fordoche townsite, Pointe Coupee Parish, has been abandoned as dry. It was drilled to a total depth of 10,019 ft.

Atlantic Refining Co. is planning to drill a 7,500-ft. wildcat test 1 mile south and 3 miles east of Jeanerette townsite, St. Mary Parish. It will be the 1 Homer Gonsoulin, 36-13s-8e.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Assumption Parish: New pay at Napoleonville—Thomas Jordan, Inc. 1 Kessler-Sternfels, 33-12s-13e, perf. 36 shots at 8,820-36 ft., IP 48 bbl. cond. daily and 2,670 M.c.f. gas, ½-in. tubing choke, TP 3,370 psi.

SOUTH LOUISIANA WILDCAT FAILURE

Calcasieu Parish: Niloco Co. 1 Lutcher-Moore Lumber Co. et al, 9-8s-11w, dry, TD 6,824 ft.

Eastern Texas

Drilling Activity High In Pewitt Ranch Field

DALLAS.—Six new locations for Pewitt Ranch field of Titus County last week brought to 27 the number of operations there, from location to those waiting on test. Included in the new locations were Coats & Moore 1 P. H. Pewitt "E," W. A. Dundas Survey, and 1 Lizzie Scott in the A. Samuel Survey. Numbers 2 Petitt "C" and 1 Petitt "D," all in the Dundas Survey, were under the name of Coats, Moore & Jackson. Humble Oil & Refining Co. has staked location for its 1 Lizzie Scott, in the Samuel Survey. All operations were scheduled to the Paluxy.

Wood County gained 10 locations. Three of these were in the Forest Hill area, two in the Merigale-Paul field, four at Pine Mills, and one at Hawkins.

In the Merigale-Paul area, both new tests will be stepouts from present production. Bert Fields 2 E. Sims was located 660 ft. northeast of his 1 E. Sims, on a 25-acre tract in the S. W. Mitchell Survey, A-386. Fields' second location was made 1,160 ft. northeast of the 1 E. Sims, as the 1 O. Sims, on a 15-acre lease in the same survey. Both wells were projected to 5,000 ft.

EAST TEXAS (DISTRICTS 5, 6, AND 6-P) WILDCAT FAILURES

Henderson County: Gene Goff 1 H. H. Richardson, R. C. Morris Sur., 5 mi. S Brownsboro, dry, TD 4,810 ft., elev. 396 ft., Pecan 2,830 ft., base Austin 4,260 ft., Woodbine 4,570 ft.

Houston County: P. K. Lake et al 1 Hill Huff, G. Greenwood Sur., 6 mi. W Grapeland, dry, TD 6,300 ft.

Hopkins County: Garrett, Moore and Holbert 1 J. W. Goggans, J. Gardner Sur.,

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3 mi. E Birthright, dry, TD 4,880 ft.

Navarro County: R. J. Caraway 1 W. F. Eckhardt, W. H. Smith Sur., 3 mi. NE Wortham, dry, TD 5,995 ft.

Navarro-Stekoll Oil Co. 1 Walter McDaniel, I. Redding Sur., 2½ mi. NW Richland, dry, TD 1,604 ft.

Van Zandt County: Delta Drilling Co. 1 S. A. Phillips, Leanders Smith Sur., A-838, 1 mi. SE Martins Mill, dry, TD 5,155 ft., Pecan 2,760 ft., Austin 3,830-4,201 ft., Woodbine 4,651 ft. by samples.

North Central Texas

High Potential Given Cabot's Caddo Discovery

WICHITA FALLS.—In southwestern Jack County, Cabot Carbon Co. completed its 1 Gladys Norman Adams, Caddo discovery 3 miles southwest of Bryson in the A. Pearson Survey. The well flowed 114 bbl. of 42°-gravity oil in 6 hours, for a calculated potential of 456 bbl. daily, from pay at 3,852-3,915 ft. Location of the new well is 2 miles north of the Kinder Strawn area and 2½ miles south of Bryson field.

In Montague County, The Texas Co. 1-B P. E. Boedecker, Block 2,851, TE&L Survey, and west offset to the company's Simpson limestone discovery, reported an unidentified lime with oil stains from 6,136-42 ft. A drill-stem test was to be run on the section. The new area is 4 miles northwest of Bowie.

Five miles southeast of Montague, Mid-Continent Petroleum Corp. 1 W. G. Embry, E. Wingate Survey, ran a 30-minute drill-stem test in the Bend conglomerate from 6,465-79 ft., which recovered 29 ft. of salt water and 25 ft. of slightly oil-cut drilling mud. A second test of the conglomerate, at 6,486-6,515 ft., open 40 minutes, recovered 300 ft. of gas in the pipe and 20 ft. of oil-cut mud. It was drilling ahead.

In northeastern Montague County, D. H. Bolin 1 Cato Heirs, F. Robertson Survey, was showing for discovery production on the basis of a drill-stem test in sand from 2,689-96 ft. Gas came to the surface in 15 minutes and oil in 1 hour and 40 minutes. The well flowed at the rate of 20 bbl. of oil an hour during the last 20 minutes of the test. Recovery was 2,650 ft. of 28°-gravity oil. Shut-in bottom-hole pressure was 1,125 psi. in 15 minutes. Contract depth on the test was 3,500 ft.

Field sources on McElroy Ranch Co. and others' 1 Glenn Taylor, Stephens County wildcat 9 miles west of Breckenridge, reported a Mississippian reef at 4,065 ft. A drill-stem test from 4,065-4,112 ft. had gas in 1 minute, estimated at 12,000,000 cu. ft. daily. Recovery was not disclosed. A second test from 4,112-37 ft. had gas in 4 minutes, mud in 40 minutes, and flowing oil in 45 minutes. The flow was estimated at 60 bbl. of oil an hour. Flowing pressure was 405 psi. and bottom-hole pressure was 1,900 psi. The pay section was estimated to be some 300 ft. high to nearest Mississippian production, in the same operators' 1 Green 3½ miles to the northwest.

NORTH TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Eastland County: Bankline Oil Co. 1 S. Mise, 48-4-H&TC, 5 mi. NE Cisco, TD 3,950 ft., elev. 1,498, perf. 3,250-69 ft., pumped 16 bbl. of 41.5°-gravity oil a day.

Haskell County: T. D. Humphrey 3 H. A. Lewellen, Sec. 58, J. Campbell Sur., 7 mi. NE Haskell, TD 2,771 ft., elev. 1,479 ft., lime pay 2,769-71 ft., 71.7 bbl. of 38°-gravity oil a day.

Jack County: Russell Maguire 1 L. L. Riley, R. K. Stewart Sur., A-1189, 9½ mi. SE Jacksboro, TD 4,701 ft., pay 4,416 ft., pumped 20.8 bbl. of 42°-gravity oil a day.

Stephens County: Wittmer, Knight & Ewing 1 L. B. Norvell, 3-7-T&P, 8 mi. SW Breckenridge, TD 4,203 ft., elev. 1,240 ft., Caddo 3,323 ft., pay 4,198 ft., (Ellenburger ?), flowed 130 bbl. of 44°-gravity oil in 12 hr., 12/64-in. choke, GOR 982 cu. ft., CP 700 psi., TP 415 psi.

Throckmorton County: Bridwell Oil Co. 11 J. C. Irwin, Samuel Hudler Sur., A-212, 9 mi. W Woodson, TD 4,645 ft., Mississippian 4,635 ft., 214 bbl. of 43°-gravity oil a day, 10/64-in. choke, GOR 600 cu. ft., CP 375 psi., TP 350 psi.

Fred M. Manning, Inc. 1-A T. R. Putnam, Sec. 9, Comanche Indian Reservation, 1⅞ mi. W production, TD 4,662 ft., PB 4,206 ft., perf. Caddo 4,273-78 ft., pumped 42 bbl. of 40°-gravity oil a day, 7 bbl. water, GOR 425 cu. ft.

NORTH TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Henry Grace Production Co. 6 R. L. Coffelt, Blk. 99, J. W. Harris Subd., Club Ranch, dry, TD 1,470 ft. in shale, Gunsight lime 1,381-85 ft.

C. L. Shive 1 W. M. Easterling, Blk. 20, Meade L. M. Pasture Subd., 2½ mi. N Megargel, dry, TD 1,452 ft., Gunsight 1,426-42 ft.

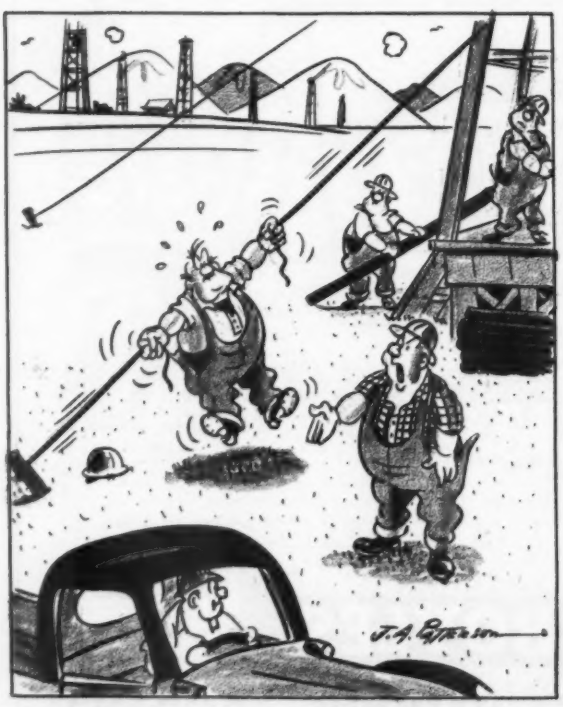
W. C. Young 1 J. G. Crowley, Lot 28, Blk. 5, Clark & Plumb, 2 mi. SE Archer City, dry, TD 3,940 ft.

Callahan County: Midland Southwestern Oil Co. 1 A. MacDonald, Sec. 101, BBB&C Sur., 5 mi. NW Baird, dry, TD 1,445 ft., elev. 1,900 ft., Sedwick lime 698 ft.

Coleman County: Richard King, Jr. 1 A. L. Steffey, Blk. 6, Coleman CSL Sur. 57, 5 mi. SE Coleman, dry, TD 2,273 ft., elev. 1,758 ft., Fry sand 2,105 ft.

Carvel Walker 1 J. A. Willimsan, G. M. Smith Sur. 231, 4½ mi. SW Trickham, dry, TD 1,276 ft.

Comanche County: L. V. Echols 1 W. S. Alexander, Wm. Schroeder Sur. 187, A-853, 4 mi. W Comanche, dry, TD 2,741 ft., elev. 1,765 ft., Marble Falls 2,340 ft., Ellenburger 2,583 ft.



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Cooke County: M. W. Blair 1 Mary T. Francis, M. Langham Sur., A-564, 2½ mi. S Myra, dry, TD 1,662 ft. in lime.

E. H. R. Sabens 1 D. L. Monroe, A. Boutwell Sur., A-99, 1 mi. W Gainesville, dry, TD 3,172 ft., Ellenburger 3,132 ft.

Seitz, Comegys & Seitz 1 Will Long, J. S. Martin Sur., A-699, 4 mi. SE Gainesville, dry, TD 3,927 ft., Ellenburger 3,885 ft.

Jack County: T. M. Weatherred 1 R. L. Voyles, Sec. 1, SPRR Sur., A-580, 3 mi. SE Antelope, dry, TD 600 ft.

Jones County: W. D. Brookover 1 R. P. Nunneley, Sec. 40, Orphan Asylum Lands, 9 mi. E Anson, dry, TD 2,410 ft., elev. 1,691 ft., Flippen 2,019 ft., King 2,305 ft.

Palo Pinto County: C. T. McLaughlin 1 Conklin-Constantin, Sam C. Neill Sur., A-355, 1½ mi. S Pickwick, dry, TD 2,400 ft., elev. 1,026 ft., Palo Pinto 467 ft.

Stonewall County: Delta Gulf Drilling Co. 1 L. A. Sparks, 161-1-H&TC, 14 mi. SW Aspermont, dry, TD 6,582 ft., elev. 1,974 ft., Noodle Creek 3,375 ft., lime 5,590 ft., Ellensburger 6,527 ft.

Taylor County: West Central Drilling Co. 1 W. W. Toombs, 5-18-T&P, 3 mi. SW Merkel, dry, TD 5,445 ft., elev. 1,920 ft., Flippen 2,725 ft., Hope 2,865 ft., reef 3,560 ft., Ellenburger 5,340 ft. had oil and gas-cut mud on DSTs.

Woodley Petroleum Co. 1 D. D. Feldman, SW SE 141-64-H&TC, 6 mi. NW Bradshaw, dry, TD 5,480 ft., elev. 2,181 ft., Coleman Junction 1,960 ft., Flippen 2,870 ft., Valera 1,560 ft., Ellenburger 5,402 ft.

Throckmorton County: Hanlon-Boyle, Inc. 1 Kate Beaty, Sec. 2232, TE&L Sur., 3 mi. SE Woodson, dry, TD 4,786 ft., Mississippian 4,592 ft.

Wichita County: Rundell Drilling Co. 1 Robb, Blk. 191, Waggoner Subd., 3¼ mi. N NW Electra, dry, TD 891 ft., sand with oil show 888-891 ft.

Young County: Everett Johnston and C. G. Butts 1 Gene Evans, Blk. 70, TE&L Sur., 7 mi. W Olney, dry, TD 1,308 ft., Breckenridge lime 916 ft.

Mississippi

Deepest Gulf Coast Test Coring Below 17,476 Ft.

JACKSON. — George Vasen, independent operator, is continuing to core ahead at his deep Stone County wildcat, which is the deepest well ever to be drilled on the Gulf Coast. Latest report from the field gave the hole a total depth of 17,476 ft. and said that 106 consecutive cores have been recovered. It is said that Vasen and his associates will drill another test 1 mile from the present well after it has been completed. The current test is the 1 Tung Oil Corp., SW NE 9-2s-11w.

Humble Oil & Refining Co. is rigging up for a 12,500-ft. wildcat test in southeastern Amite County. The well will be the 1 W. A. Stockard, 33-1n-6e. Atlantic Refining Co. and Stanolind Oil & Gas Co. are supporting the test, which will be drilled with a Humble rig.

Humble Oil & Refining Co. 1 Hugh Y. Junkin et al, 12-8n-2w, 4 miles northwest of Pine Ridge field, northern Adams County, has been abandoned as dry. The test went to 7,100 ft.

A deep Smackover test has been scheduled by Gulf Refining Co. for the Flora field area, Madison County. It will be Gulf's 1 J. R. Anderson et al, 2-8n-1w, with a proposed depth of 11,500 ft. or the Smackover lime.

A. M. Keisker, independent of Jackson, has surveyed location for a proposed 8,800-ft. Travis Peak or Wilson test about 3½ miles southwest of Lake, Scott County. It will be the 1 E. M. and M. T. Seiler, C SW NW 33-6n-9e.

ALABAMA WILDCAT FAILURE

Escambia County: John S. Neilson & W. E. Walker 1 C. E. Bochelor, 25-1n-6e, dry, TD 6,936 ft.

MISSISSIPPI WILDCAT FAILURE

Noxubee County: Harvey Schmidt 1 Pete Flora, 12-13n-16e, dry, TD 3,280 ft.

Appalachian Field

Gas Strike Brought In For Limestone Hill

PITTSBURGH. — In the Limestone Hill area, Steel district, Wood County, West Virginia, United Fuel Gas Co. 6465 O. H. Blair, elevation 1,078 ft., was completed gaging 9,549,000 cu. ft. of gas, natural, from the Oriskany sand, total depth 5,402 rt. (See wildcat paragraphs following). In Elk district, Kanawha County, Harold H. Neff, Trustee, 1 Maggie E. Stricklen, was dry at 5,261 ft. The following tops were logged: Corniferous lime 5,026 ft., Oriskany sand 5,164 ft. In Dry Fork district, Tucker County, Cumberland & Allegheny Gas Co. 1-A-425 Jason Harman, elevation 3,304 ft., reache a lime formation at 8,630 ft., and at 8,833 ft. encountered a pocket testing 100,000 cu. ft. of gas, which soon exhausted. Drilling is continuing at 8,860 ft. A good shallow sand gas well was noted in Union district, Jackson County, at Bar Run Gas Co.'s 1 Cecil Durst, which resulted in 1,100,000 cu. ft. of gas in the brown shale. Total depth is 3,653 ft.

In Napier Township, Bedford County, Pennsylvania, South Penn et al, Stone & Eberly 1 Jesse B. Miller, elevation 1,666 ft., after cementing off and by-passing the tools, is now at a depth of 7,258 ft. In Unity Township, Westmoreland County, Peoples Natural Gas Co. 1-3921 Fred Musnug, elevation 2,100 ft., is drilling at 3,165

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ft. In Croyle Township, Cambria County, Peoples Natural Gas Co. 1-3878 Joseph Gavany, elevation 2,245 ft., was completed at a depth of 4,058 ft. for a final test of 18,000 cu. ft. of gas. The well has been plugged back to a depth of 3,348 ft. and shut in (see wildcat paragraphs following).

WEST VIRGINIA SUCCESSFUL WILDCAT

Wood County, Steele district: United Fuel Gas Co. 6465 O. H. Blair, elev. 1,078 ft., 9,549,000 cu. ft. of gas, natural; Corniferous lime 5,255 ft., Oriskany sand 5,380 ft., show of gas 5,383 ft., gas 5,388-5,401 ft., TD 5,401 ft., rock pressure 815 psi. in 14 hours.

PENNSYLVANIA SUCCESSFUL WILDCAT

Cambria County, Croyle Township: Peoples Natural Gas Co. 1-3878 Joseph Gavany, elev. 2,245 ft., 18,000 cu. ft. of gas, TD 4,058 ft., PB 3,348 ft.

Kansas

Wildcat in Ness County Shows for Small Well

W. L. HARTMAN appears to have a small well in his 1 Scott, C NE NE 28-17-26, a wildcat in western Ness County, in the wide-open western part of the state where so far only a few, small, scattered pools have been found. Testing showings encountered in Mississippi lime, the well swabbed 32 bbl. of oil in the first 8 hours. Total depth is 4,443 ft. with top of the Mississippi at 4,436 ft. (—1,949 ft.). Hole is open below 4,437 ft.

The well is about 2 miles southwest of the Kansada pool, nearest of a small group of isolated pools in that part of the state. Except for these few, small pools, there is no other production within 30 to 35 miles.

In eastern Kingman County, on the western edge of the Central Kansas Uplift trend of pools, Earl Wakefield also found promising oil and gas showings in the Mississippian and has run casing to test after drilling to the Arbuckle. Mississippian was topped at 3,797 ft. (—1,413 ft.), and in a 30-minute drill-stem test at 3,798-22 ft. flowed gas at an estimated rate of 200,000 cu. ft. of gas daily and recovered 210 ft. oil-cut mud in the break-down. A later 45-minute drill-stem test at 3,822-55 ft. in Mississippi dolomite, topped at 3,822-55 ft., resulted in a recovery of 80 ft. of oil and 160 ft. of oil-cut mud. Arbuckle, logged at 4,331-61 ft., failed to show for production and casing has been run only through the Mississippian prospective zones to 3,894 ft.

In northwestern Stafford County, Vickers Petroleum Co. has a prospective new pool where its 1 Frey, SW SW NE 7-21-14, swabbed at the rate of 15 bbl. of oil per hour in starting tests of showings encountered in Arbuckle lime. Pay zone has not been acidized. Total depth is 3,722 ft. with casing at 3,716 ft., 1 ft. in the top of the Arbuckle. Nearest production is in the Pritchard pool, 4 miles to the northeast.

Four and a half miles to the southeast in the NW SW SW 23-21-14, and 2½ miles west of the Pundsack pool, Crown Oil Co. 1 Van Winkle swabbed 3 bbl. of 23° oil per hour for 12 hours while testing Lansing-Kansas City topped at 3,419 ft. (—1,484 ft.). Production is from a zone at 3,592-96 ft., where casing was perforated with hole plugged back to 3,710 ft. The zone was acidized with 500 gal. Arbuckle lime, topped at 3,767 ft. and drilled out to 3,784 ft., tested water.

In the south central part of the same county, J. M. Huber Corp. and associates have a prospective Viola lime well at their 1 Kachelman, SE SE SW 7-25-13. Top of the Viola was logged at 4,055 ft. (—2,091 ft.), and in a 60-minute drill-stem test at 4,074-86 ft., gas was at the surface within 5 minutes. In the break-down 2,200 ft. of oil was recovered. Bottom-hole pressure was 965 psi. Casing has been run to 4,075 ft., 1 ft. in the top of the section. The location is 2 miles northeast of the Northeast Kipp pool.

KANSAS SUCCESSFUL WILDCAT

Woodson County: Ashlock and Goodrich 1 Manifold, SW SW NW 31-23s-15e, pumped 11 bbl. of oil per day from Mississippian at 1,555-87 ft., TD.

KANSAS WILDCAT FAILURES

Barton County: Gulf 1 Feltes, NW NW SE 26-16s-12w, elev. 1,920 ft., dry, TD 3,590 ft., anhydrite 797 ft., Heebner 2,997 ft., Kansas City 3,107 ft., Sooy 3,371 ft., Arbuckle 3,380 ft., quartzite 3,588 ft., to be a salt water disposal well.

Kiowa and Driller Gas 1 Blyth, NW NW SE 1-17s-12w, elev. 1,872 ft., dry, TD 3,370 ft., anhydrite 735 ft., Heebner 2,956 ft., lime 3,051 ft., Lansing 3,062 ft., Sooy 3,323 ft., Arbuckle 3,334 ft.

Herndon Drilling 1 Hawkins, NW NW NW 3-19s-13w, elev. 1,899 ft., dry, TD 3,431 ft., Lansing 3,172 ft., Sooy 3,400 ft., Arbuckle 3,414 ft.

Cowley County: Saco Oil et al. 1 Webb est., NE NW SE 9-34s-8e, dry, TD 2,445 ft., no tops reported.

Ellis County: H. H. Blair 1 Brungardt, SW SW SW 15-13s-18w, dry, TD 3,849 ft., anhydrite 1,405 ft., Topeka 3,112 ft., Heebner 3,366 ft., Lansing 3,415 ft., Sooy 3,685 ft., Arbuckle 3,791 ft.

Russell County: Ferrell Drilling 1 Luerman, NE NE NW 21-12s-14w, elev. 1,788 ft., dry, TD 3,297 ft., anhydrite 850 ft., Topeka 2,675 ft., Heebner 2,893 ft., Lansing 2,943 ft., Sooy 3,246 ft., Arbuckle 3,272 ft.

Anschutz 1 Elsasser, SE SE SE 32-15s-14w, elev. 1,922 ft., dry, TD 3,440 ft., anhydrite 920 ft., Heebner 3,062 ft., Lansing 3,145 ft., Sooy 3,390 ft., Arbuckle 3,406 ft.

Stafford County: Mallard 1 Delp, SW SW NE 16-24s-13w, elev. 1,921 ft., dry, TD 4,160 ft., Lansing-Kansas City 3,555 ft., Sooy 3,913 ft., Viola 3,926 ft., Simpson 4,065 ft., Arbuckle 4,119 ft.

Sumner County: Allison-Hatfield 1 Voils,

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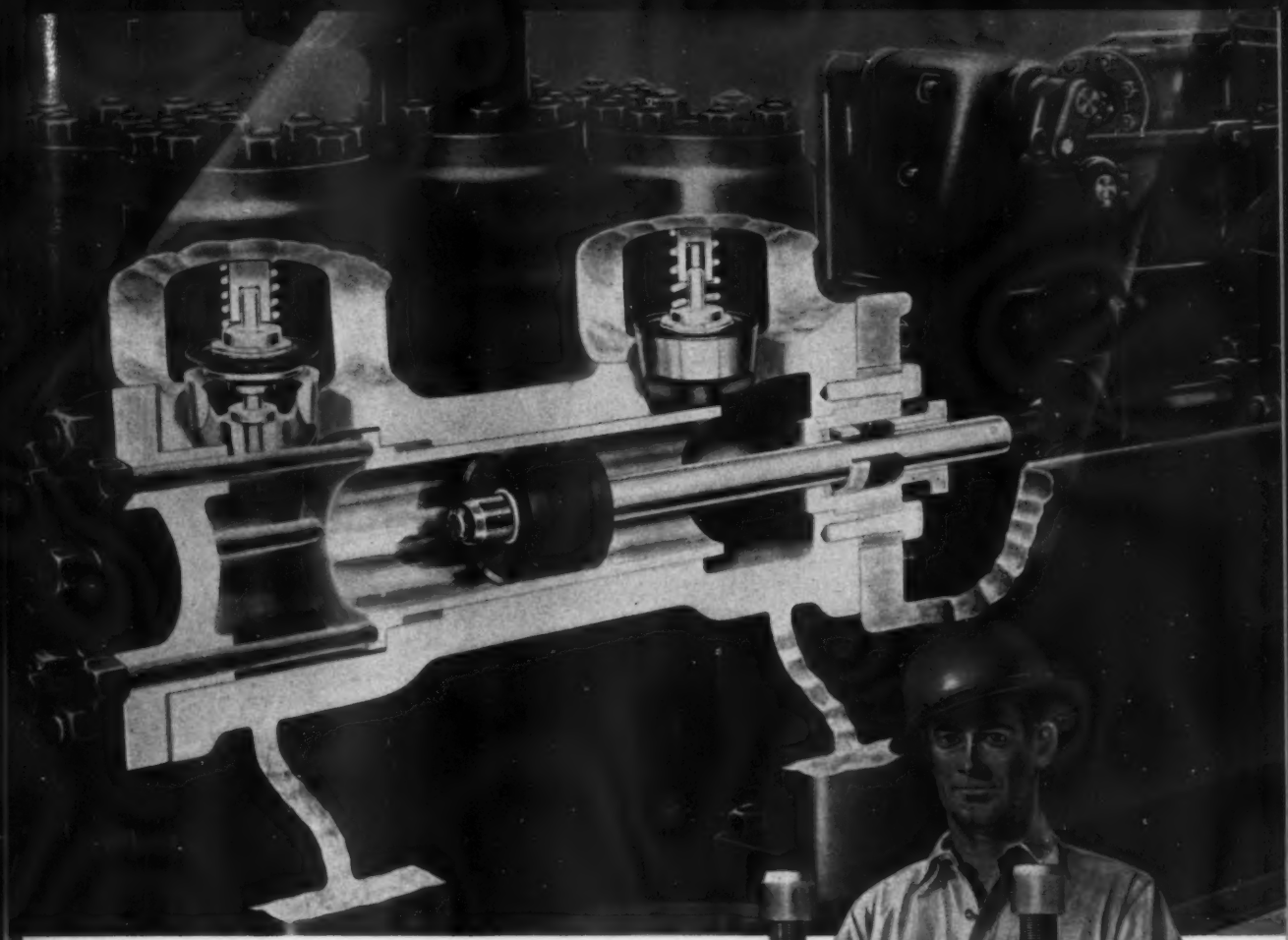

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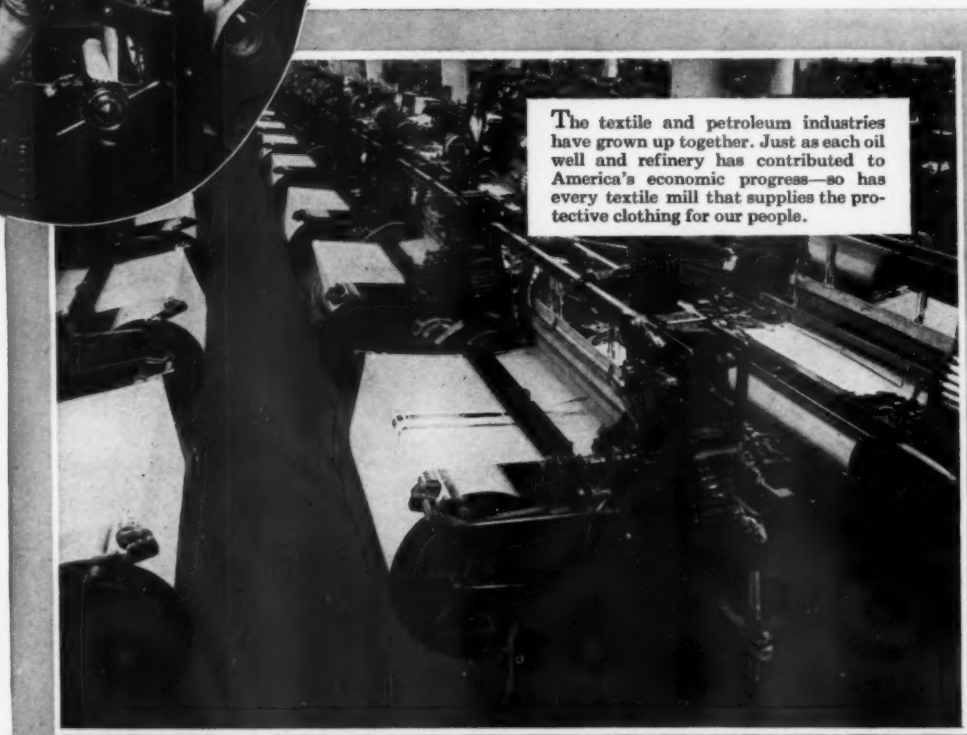

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NW NW NE 17-30s-1w, elev. 1,266 ft., dry. TD 4,025 ft., Stalnaker 2,581 ft., Kansas City 2,911 ft., Mississippi lime 3,515 ft., Simpson sand 3,872 ft., Arbuckle 3,977 ft.

CENTRAL NEBRASKA SUCCESSFUL WILDCAT

Harlan County: Alpine and B & R 1 Fischer, SW SW SE 33-1n-18w, elev. 2,023 ft., pumped 100 bbl. of oil per day from Lansing-Kansas City at 3,366-74 ft., TD 3,450 ft., Heebner 3,204 ft., Lansing 3,228 ft.

Illinois-Ind.-Ky.

New Illinois Discovery Flows 900 Bbl. Per Day

OPENING a new producing area about a mile north of Billett, Lawrence County, Illinois, Illinois Mid-Continent Co. 1 Leighty-Klinger Community, S½ NW SE NE 20-3n-11w, swabbed and flowed more than 900 bbl. of oil in the first 24 hours. Production is from McClosky lime at 1,823-28 ft. The area is east of production in the Lawrence pool.

The area on the northwest side of the Rural Hill pool, 5 miles southwest of McLeansboro, southwestern Hamilton County, Illinois, appears to be getting an exceptionally good well where Stewart Oil Co. is testing the Aux Vases zone at its 1 Lena James, NW SE NE 11-6s-5e. The well swabbed and flowed at the rate of nearly 600 bbl. of oil per day following a 90-qt. shot of the zone, logged at 3,194-3,214 ft. Total depth is 3,232 ft. with 5½-in. casing at 3,184 ft.

Ralph Halbert and associates 1 Waddle, NW NE SE 22-2s-13w, 2 miles southeast of Keensburg, Wabash County, Illinois, pumped 120 bbl. of oil with 25 bbl. of water per day to prove a new area about a mile east of production at the north end of the Keensburg-Consolidated pool. Pay zone is the Waltersburg sand at 1,950-69 ft.

Eastward across the Wabash River in northern Posey County, Indiana, Illinois Mid-Continent Co. has completed its 1 Ford, CWL NW NW SW 18-4s-13w, to open the Black River pool. Producing from the Clore zone at 1,866-78 ft., the well pumped 56 bbl. of oil per day. Nearest production is in the Rogers pool about 1½ miles to the southeast.

Two more pay zones have been established in the East Griffin area, 7 miles northeast of New Harmony, in the same county, with the dual completion by Calvert Drilling Co. of its 1 E. B. Mumford, SE SE NW 33-3s-13w. They are the Degonia sand, found at 1,763-80 ft., and the Palestine sand, at 1,843-50 ft. The well flowed 450 bbl. of oil daily from the two zones. Total depth is 2,015 ft. Casing was run through both zones to 1,992 ft. and then perforated.

The Caney Mound pool, 3½ miles northwest of Uniontown, Union County, western Kentucky, is being extended ½ mile to the north by Delta Drilling Co. at its 1 Uniontown Bank, 8-P-20. On a drill-stem test of O'Hara at 2,500-06 ft., the well gas at the surface within 4 miles after the tester was opened and flowed clean oil within 70 minutes. Following the test, hole was carried to a total depth of 2,626 ft. and casing was run through the O'Hara zone to 2,624 ft. for completion.

ILLINOIS WILDCAT FAILURES

Bond County: Benoist Brothers 1 Koontz, NE NW NE 25-7n-4w, dry, TD 940 ft.
H. M. Horton 1 Brinkley Unit, SE NE SW 29-4n-4w, dry, TD 3,304 ft.
Clay County: Superior Oil Co. 1 Barber, SE SE NW 10-4n-6e, dry, TD 2,932 ft.
Clinton County: H. R. Braun 1 Albers, NE SW NW 35-3n-3w, dry, TD 1,173 ft.
Cumberland County: J. L. Cowan 1 Tolch, SE NE SE 11-9n-7e, dry, TD 2,500 ft.

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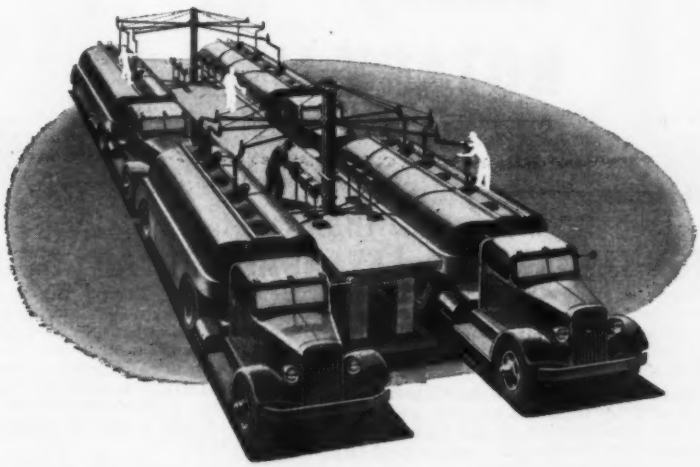

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Douglas County: J. W. Schwald 1 Wilse, SW SE NW 33-15n-14w, dry, TD 484 ft.
Edgar County: Paralux Oil Co. 1-A Swinford, NW SE NE 28-14n-11w, dry, TD 1,200 ft.
Edwards County: Hayes Drilling Co. and Big Four Oil & Gas Co. 1 Slater, SE NE SE 23-1n-14w, dry, TD 2,955 ft.
Skiles Oil Corp. 1 Gadan-Crewell, NE NE SW 5-1n-14w, dry, TD 3,166 ft.
Effingham County: Sam Malis 1 Webster, SW SE NW 34-6n-6e, dry, TD 2,804 ft.
Madison County: Melvin Frued 3 Linenbroker, SE SW NE 32-6n-6w, dry, TD 564 ft.
Spade Drilling Co. 1 Hertel, NW SE NW 34-6n-6w, dry, TD 583 ft.
Marion County: G. C. Schoonmaker 1 Reasor, SW NW SW 24-3n-2e, dry, TD 2,965 ft.
Saline County: Skiles Oil Corp. 1 Bramlett, NE NW NW 36-7s-7e, dry, TD 3,071 ft.
Washington County: Dale Hopkins 1 Daun, SW SE SW 5-1s-3w, dry, TD 1,229 ft.
Wayne County: R. Gaines 1 Hilliard, SE SW SW 10-1s-5e, dry, TD 3,132 ft.
Miami Operators 1 Borah, SE NW NW 22-1s-9e, dry, TD 3,367 ft.
National Associated Petroleum Co. 1 Burgess, SW SW SE 33-2n-5e, dry, TD 3,156 ft.
White County: J. L. Crawford 1 Pumphrey, NW NE NE 8-6s-10e, dry, TD 2,953 ft.
Williamson County: Absher & Booth 1 Gent, SE NE SW 33-8s-4e, dry, TD 2,823 ft.

INDIANA SUCCESSFUL WILDCATS

Posey County: Calvert Drilling Co. 1 Mumford, SE SE NW 33-3s-13w, IP 451 bbl., Degonia sand 1,763-80 ft. and Palestine sand 1,833-64 ft., TD 2,015 ft. (Opens 2 new pay zones East Griffin pool).
Illinois Mid-Continent Co. 1 Ford, C WL NW NW SW 18-4s-13w, IP 56 bbl., Clore sand 1,866-78 ft., TD 1,880 ft. (Opens Black River pool).

INDIANA WILDCAT FAILURES

Daviess County: Theriac & Badollet 1 Dilley, SW SE NE 2-2n-5w, dry, TD 549 ft.
E. Michel 1 Fiddler, NW SE NE 24-5n-6w, dry, TD 1,000 ft.
A. L. Cochran 1 Sullivan, NW NW NW 32-5n-6w, dry, TD 1,254 ft.
Dubois County: Dennison & Goodwin 1 Gutzsell, NW NE NE 18-2s-4w, dry, TD 725 ft.
Gibson County: Winmar Oil Co. 1 Sutton, NE SE SW 32-1s-10w, dry, TD 2,112 ft.
Greene County: Skiles Oil Corp. 1 S. B. Newsom, Jr., SW NW SE 32-8n-5w, dry, TD 2,574 ft.
Parke County: Carter Oil Co. 1 Harris, NW NW NW 17-14n-7w, dry, TD 1,317 ft.
Perry County: Ted Lindsay 1 Hanlon, NW SW NW 26-5s-3w, dry, TD 725 ft.
Posey County: Ashland Oil & Refining Co.

Continued on page 161)

Sets A New High Quality Level

FOR JACKKNIFE and STANDARD ROTARY RIGS...

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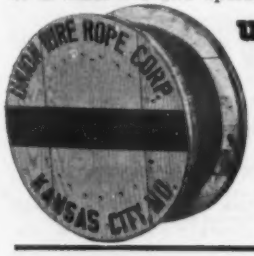

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CITY_____ ZONE____ STATE_____

Oklahoma

Production Indicated at Two Camp Pool Outposts

LIMITS of the northwestern sector of the Camp pool on the Stephens-Carter County line are being extended westward into the former county. Arthur B. Ramsey 1 Martin, NE SE SE 1-2s-4w, which previously had good showings of oil in a zone at 3,920-80 ft., got additional promise of making a well in a deeper zone at 4,286-4,341 ft. In a 98-minute drill-stem test of this interval, gas showed within 4 minutes after the tool was opened, and during the last 8 minutes of the test the well flowed oil at an estimated rate of 40 bbl. per hour. Casing has been run to the total depth at 4,341 ft. for completion.

Further westward in the SE SE SE 2-2s-4w, Stanolind Oil & Gas Co. has another promising outpost well for the area at its 1 Chickasaw Investment. The well already has two prospective producing zones, one in what is believed to be the Tussey sand at 4,037-67 ft., and the other in a sand at 4,383-4,420 ft. In a 60-minute drill-stem test of the upper zone, the well flowed at the rate of 7 bbl. of 33° oil per hour. A drill-stem test of the lower zone yielded 612 ft. of oil-cut mud in the break-down. Operators are drilling ahead.

Atlantic Refining Co. has completed an exceptionally good Springer sand well on the north flank of the Fox-Graham pool, southwest of the Camp pool in Carter County. The well is 2 Carpenter, NW NW SE 22-2s-3w, ¾ mile southwest of the Fox townsite. It flowed 229 bbl. of 37° oil through ¼-in. choke in 24 hours. Production is from perforations at 4,010-12 ft. with casing run through the zone to 4,080 ft. The section was topped at 3,958 ft. and hole drilled to a total depth of 4,250 ft.

Fleet Drilling & Production Co. has opened a new gas and distillate producing area west of production of the Palacine pool in Stephens County. Its 1 Phail, SE NW NW 7-2s-6w, flowed at the rate of 9,450,000 cu. ft. of gas and 13.15 bbl. of 64.6° distillate per day in a potential test through 1-in. choke. The well was open only 2½ hours. Production is from Pennsylvanian sand, in which casing, cemented at 3,925 ft., was perforated at 3,740-45 ft. Total depth is 4,260 ft.

Lincoln County appears to have another new pool, located about 4½ miles southwest of Stroud, where Harp Oil Co. 1 McVey, NE SW SE 6-14n-6e, flowed at the rate of about 25 bbl. per day while starting tests of Prue sand at 3,238-48 ft. A hydrafrac application will be made although operations are being delayed currently by a fishing job. In the meantime, this company's 1 Renner, NE NW NE 7-14n-6e, a south offset to the discovery well, also has found good showings in the same sand at 3,225-39 ft. to confirm the discovery. Casing has been run to the top of the sand for testing.

Greenbriar Oil Co. continues to test its 1

Wentzell, NE NW NW 33-8n-3e, promising wildcat producer southwest of the Southwest Goldsby pool in northeastern McClain County. Latest test is in the top part of the Joins sand with casing perforated at 11,491-501 ft. From this interval, the well flowed at the rate of 2½ bbl. of 44° oil per hour through ¼-in. choke. The well previously tested good production in a lower zone of the Joins sand with perforations at 11,520-25 ft. The well also has good potential production in the overlying Bromide section, in which the well flowed up to 50 bbl. per hour in drill-stem tests. Bromide was topped at 10,674 ft. Top of the Joins sand is 11,496 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: Geological test in Bayou field—Jones Oil 1 Wallace, W/2 NW NW 6-5s-1w, elev. 862 ft., pumped 100 bbl. of 35.5°-gravity oil per day from sand at 3,385-3,528 ft., TD 5,028 ft.

Pottawatomie County: Deep Rock 1 DeJarnette, NE NE NE 17-6n-3e, ⅝ mi. W of N Rover, and 1⅜ mi. NW Viola production, est. elev. 1,027 ft., flowed 108 bbl. of oil per day from Viola at 4,250-70 ft., ¼-in. tubing choke, TD 4,669 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: J. W. Baldwin 1 Petty, NE NE NW 21-2s-12w, dry, TD 2,002 ft., Megargel 1,860 ft.

Creek County: Wilcox 1 Rowell, SE SE NW 33-18n-8e, elev. 871 ft., dry, TD 2,940 ft., Hogshooter 897 ft., Checkerboard 1,335 ft., conglomerate 1,384 ft., Oswego 2,270 ft., Prue 2,372 ft., Verdigris 2,428 ft., Skinner 2,457 ft., no Red Fork, Inola 2,788 ft., Bartlesville 2,825 ft.

Garvin County: Coronado Oil 1 Humphrey, SW NW SE 11-3n-2e, est. elev. 951 ft., dry, TD 2,767 ft., Tonkawa 1,885 ft., Okesa sand 2,096 ft., sand 2,179 ft. and 2,230 ft., Hogshooter 2,310 ft., Layton 2,390 ft., McLish 2,578 ft., McLish sand 2,668 ft.

Bouse-Showalter 1 Holland, SE SE SE 8-4n-3e, elev. 1,153 ft., dry, TD 2,903 ft., Belle City 2,325 ft., sand 2,606 ft.

Kay County: Absher & Booth 1 Martin, NE NW NW 32-28n-1w, 2 mi. S of SE Braman, elev. 1,019 ft., dry, TD 2,701 ft., Pawhuska 1,690 ft., Oread 1,993 ft., Endicott lime 2,190 ft., Tonkawa lime 2,328 ft., Tonkawa sand 2,413 ft., upper Layton sand 2,826 ft., lower Layton sand 2,992 ft., Checkerboard 3,103 ft., conglomerate 3,133 ft., Big lime-Oswego 3,266 ft., basal Pennsylvanian-Woodford 3,450 ft., sandy dolomite 3,470 ft., Wilcox 3,487 ft., Tyner 3,537 ft., Arbuckle 3,633 ft.

Kiowa County: Ace Oil 1 Sheppard, SW SW NW 27-7n-16w, Gotebo district, dry, TD 475 ft. in shale.

Love County: Anderson-Prichard 1 Wilkins, SE SE SE 8-6s-2e, elev. 871 ft., dry, TD 5,463 ft., Springer 110 ft.

(Continued on page 162)

Canadian Fields

Fina-Bulwark Strike Installing Pump

CALGARY.—Fina-Bulwark-Province 1, indicated Viking sand oil discovery in South Central Alberta is being readied for pump. Crew has been swabbing at the rate of around 2 bbl. hourly at the well. Basic sediment and water cut is measured at around 0.25 per cent. The well, located in LSD 3, 20-38-12w4, is in the Coronation-Bulwark area, about 125 miles northeast of Calgary. Hole has been cleaned out and crew is preparing to install pump prior to continuing further testing.

Production is coming from the gun-perforated interval at 2,905-65 ft., and is rated at 34.8° gravity. Originally scheduled as a Devonian test, the well was carried down to 4,082 ft. after oil encouragement in the higher Viking section. Failing in the Devonian, the hole was plugged back to 3,300 ft.

The venture is the first of two tests to be drilled by Canadian Fina Oil, Ltd., on a 56,000-acre farmout from Husky Oil & Refining, Ltd., and Phillips Petroleum Co. Sun Oil Co. carried out the seismograph survey and located the seismic feature on the lands. Canadian Fina acquires a 50 per cent interest in the spread for its drilling, while Sun's interest is 25 per cent, and the Husky-Phillips team share 25 per cent in the block.

Northern Development Co., Ltd., has placed its southwest Leduc oil well on production. It is located on a quarter-section farmout from the British American Oil Co., Ltd., and Leduc Leaseholds, Ltd. The well, P. D. 1, in LSD 11, 1-50-27w4, is classed as a discovery of a new D-3 Devonian pool, about ¼ mile west of D-2 zone production.

The D-3 was topped around 5,396 ft., or 2,027 ft. subsea, an indicated 7 ft. below the D-3 oil-water line in the main Leduc-Woodbend oil field. Hole was completed at 5,420 ft. and the section at 5,319-5,420 ft. was gun-perforated. During a 6-hour test the well rated an initial potential of 1,060 bbl. daily.

The past week brought 22 completions in Alberta, to boost the total number of wells completed since the first of this year to 449. Fifteen were oil wells, one was a natural-gas producer, and six wells were dry holes.

CANADIAN WILDCAT FAILURES

Amerada-Crown C.F. 42-24, LSD 9, 24-48-17w4, TD 4,370 ft.

Bailey-Linaria 1, LSD 11, 23-61-27w4, TD 5,306 ft.

Uncana-Whitemud 1, LSD 7, 13-51-25w4, TD 4,206 ft.

Brown-Heep-Rutherford-CPR 1, LSD 8, 2-26-19w4, TD 6,197 ft.

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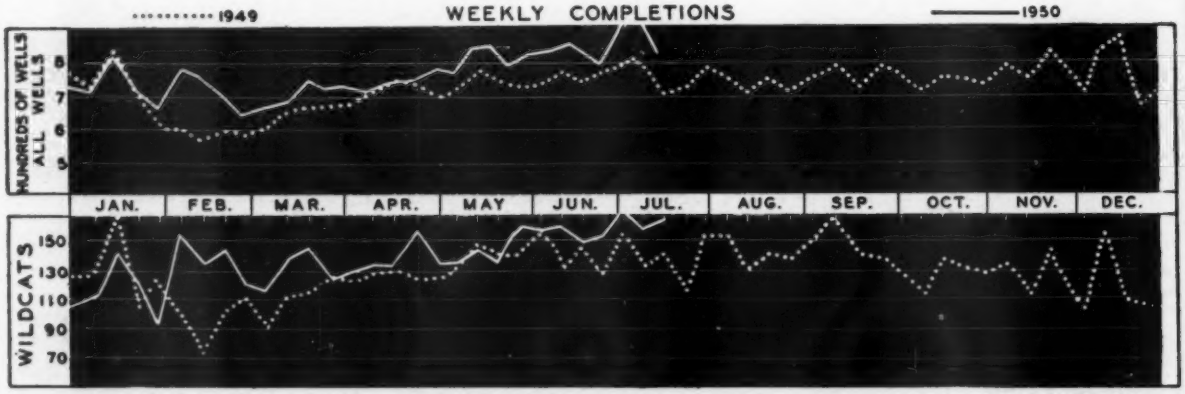
CURRENT STATISTICS

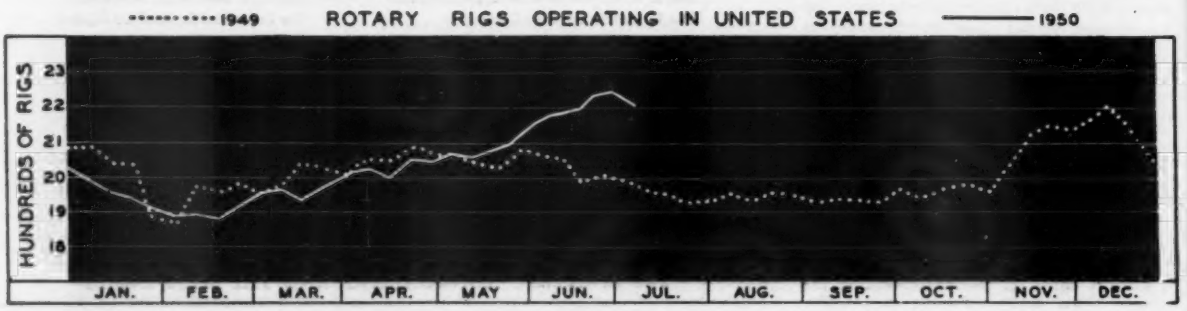
EXPLORATION

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JULY 15, 1950

	Total of all wells					July 15		Wildcat completions and discoveries					Cumulative total, 1950				
	Comp.	Oil	Gas	Dry	Footage	1950	1949	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	11	6	0	*5	12,904	233	624	0	0	0	0	0	0	0	0	0	0
Pennsylvania	14	5	4	*5	29,745	507	981	0	0	1	0	1	0	0	1	2	3
West Virginia	15	3	10	2	44,251	339	263	0	0	1	0	1	0	0	11	12	23
Ohio	25	8	6	†11	46,919	515	593	0	0	0	0	0	1	0	1	7	9
Indiana	40	15	2	23	66,228	760	685	2	0	0	12	14	22	0	1	148	171
Kentucky	23	9	0	14	35,511	521	472	1	0	0	1	2	13	0	1	43	57
Illinois	83	36	0	†47	191,343	1,402	1,262	0	0	0	20	20	28	0	1	311	340
Michigan	19	5	0	‡14	49,159	435	508	0	0	0	9	9	18	0	4	140	162
Kansas	64	31	8	†25	199,104	1,948	1,682	1	0	0	9	10	49	0	4	309	362
Nebraska	3	1	0	2	11,882	52	16	1	0	0	1	2	2	0	1	23	26
Oklahoma	117	61	20	†36	414,297	2,852	2,294	2	0	0	16	18	88	5	11	351	455
Texas	271	182	8	81	1,125,183	8,444	7,319	12	2	0	45	59	259	21	65	1,340	1,685
North Central (Dist. 7-B & 9)	73	35	0	38	196,817	2,578	2,352	6	0	0	19	25	111	2	17	511	641
West (Dist. 7-C & 8)	79	66	1	12	412,305	2,463	1,736	3	0	0	7	10	53	2	2	257	314
Panhandle (Dist. 10)	28	23	4	1	85,006	505	576	0	0	0	0	0	1	0	2	11	14
Eastern (Dist. 5, 6, & 6-P)	17	9	0	8	75,164	621	468	0	0	0	6	6	8	3	1	112	124
Gulf Coast (Dist. 2 & 3)	36	22	1	13	175,906	1,183	1,076	2	0	0	7	9	42	7	24	186	259
Southwest (Dist. 1 & 4)	38	27	2	9	177,985	1,094	1,111	1	2	0	6	9	44	7	19	263	333
Louisiana	45	34	2	9	282,945	1,263	1,150	0	2	0	3	5	29	12	4	101	146
Northern	24	16	2	6	79,150	664	620	0	1	0	2	3	4	2	1	45	52
Southern	21	18	0	3	203,795	599	530	0	1	0	1	2	25	10	3	56	94
Arkansas	15	8	0	§7	46,005	209	167	2	0	0	2	4	5	0	0	51	56
Mississippi	1	0	0	1	3,280	174	196	0	0	0	1	1	8	2	0	61	71
Southeastern States	1	0	0	1	6,936	34	25	0	0	0	1	1	1	0	1	20	22
Montana	16	8	3	5	31,180	106	129	0	0	0	1	1	1	0	0	14	15
Wyoming	10	5	0	5	39,380	305	320	0	0	0	3	3	9	0	0	37	46
Colorado-Utah	3	1	1	1	15,265	35	61	1	0	0	1	2	2	0	0	24	26
New Mexico	7	5	0	2	27,778	326	300	0	0	0	1	1	10	1	0	29	40
California	38	23	1	†14	170,185	931	1,457	1	0	0	10	11	14	0	2	193	209
Miscellaneous	0	0	0	0	0	9	15	0	0	0	0	0	0	0	0	9	9
Total United States	821	446	65	310	2,849,480	21,400	20,519	23	4	2	136	165	559	41	108	3,225	3,933
Total previous week	908	542	46	320	3,354,516	....	....	24	1	4	129	156	536	37	106	3,089	3,768
Total July 15, 1949	703	368	58	277	2,377,061	....	....	20	0	2	120	142	496	49	100	2,931	3,576

Service wells included: *5, †1, ‡3, §4.





DAILY AVERAGE PRODUCTION FOR WEEK

	July 15 crude oil	B. of M. July demand	July 8 crude oil
Alabama	1,500	1,600	1,850
Arkansas	79,850	89,000	79,800
California	883,500	860,000	883,000
Colorado	59,200	68,000	60,100
Eastern	62,500	63,000	62,600
Florida	1,500	1,400	1,525
Illinois	172,400	186,000	176,900
Indiana	30,000	30,000	31,700
Kansas	277,600	290,000	289,600
Kentucky	28,400	28,000	29,200
Louisiana	563,600	565,000	563,550
North Louisiana	118,300	.....	118,250
South Louisiana	445,300	.....	445,300
Michigan	39,600	47,000	39,800
Mississippi	111,300	110,000	108,200
Montana	22,100	25,000	21,900
Nebraska	2,450	3,000	2,100
New Mexico	132,575	148,000	132,575
Oklahoma	443,450	445,000	433,900
Texas	2,329,900	2,190,000	2,329,900
Dist. 1 (Southwest)	29,450	.....	29,450
Dist. 2 (Southwest)	138,875	.....	138,875
Dist. 4 (Southwest)	218,000	.....	218,000
Dist. 3 (Gulf Coast)	390,150	.....	390,150
Dist. 5 (Eastern)	36,200	.....	36,200
Dist. 6 (Eastern)	93,600	.....	93,600
East Texas field	275,400	.....	275,400
Dist. 7-C (West)	57,725	.....	57,725
Dist. 8 (West)	772,775	.....	772,775
Dist. 7-B (W. Central)	72,100	.....	72,100
Dist. 9 (N. Central)	153,100	.....	153,100
Dist. 10 (Panhandle)	92,525	.....	92,525
Utah	3,600	4,000	3,550
Wyoming	158,400	156,000	158,200
Total United States	*5,403,425	5,310,000	5,407,950
Change from prev. week, down	4,525		
Canada	81,000	.....	70,745

Total U. S. production January 1-July 15 ..... †998,472,440 bbl.
Same period last year (crude plus cond.) ..... 1,009,632,380 bbl.

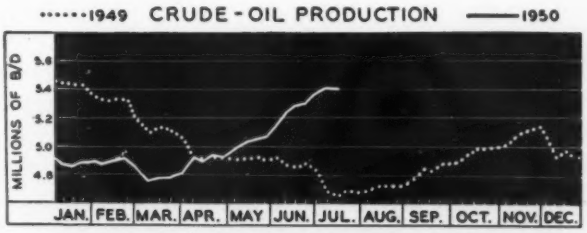
*Not including 97,250 bbl. condensate. †Including 19,096,665 bbl. condensate.

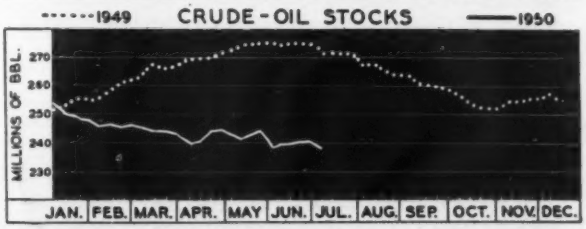
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

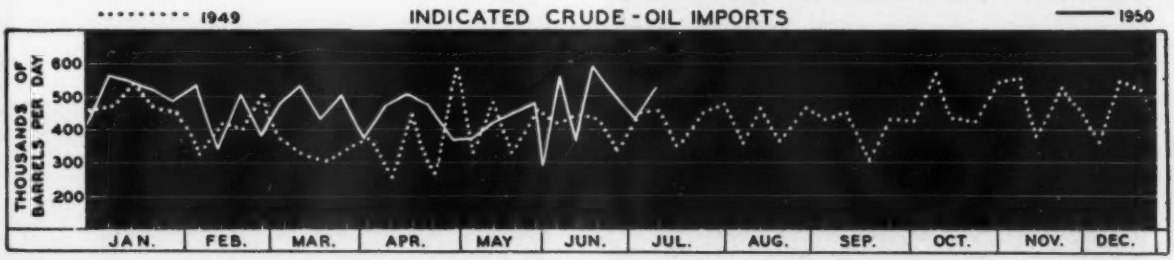
(Thousands of barrels)

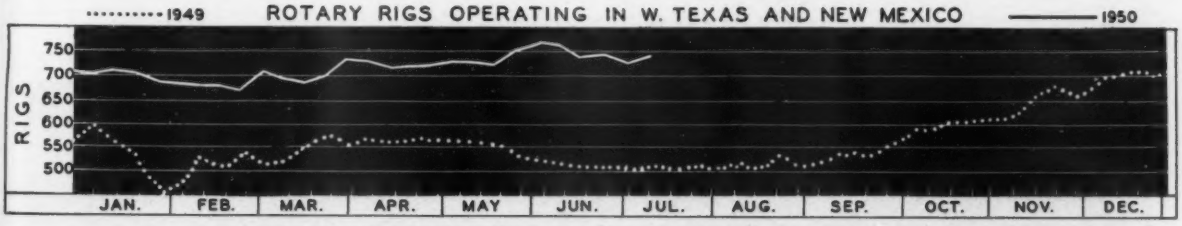
	July 8, 1950	July 1, 1950	July 9, 1949
Pennsylvania Grade	2,754	2,884	3,009
Other Appalachian	1,580	1,578	2,251
Illinois, Indiana, Michigan	8,838	8,834	14,443
Arkansas	2,983	3,071	2,953
Louisiana	14,107	15,536	14,587
North	3,269	3,765	3,432
Gulf	10,838	11,771	11,155
Mississippi	2,114	2,176	2,917
New Mexico	5,801	5,894	7,576
Oklahoma and Kansas	33,813	34,125	39,174
Texas	111,736	112,399	128,352
East Texas	15,372	15,787	17,714
West Texas	41,522	41,952	51,746
Texas Gulf	26,856	27,221	30,046
Other Texas	27,986	27,439	28,846
Rocky Mountain	12,366	12,646	13,955
California	34,683	35,495	34,896
Foreign	6,496	6,305	7,807
Total	237,271	240,943	271,920

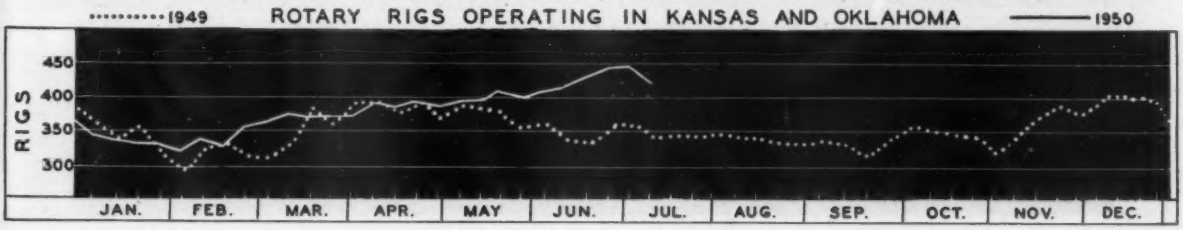
*Bureau of Mines.











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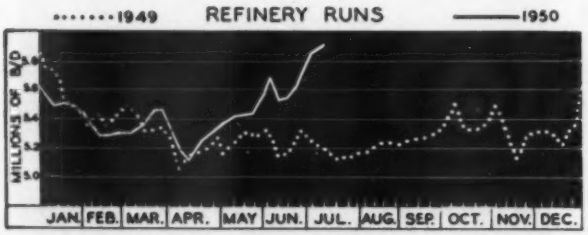
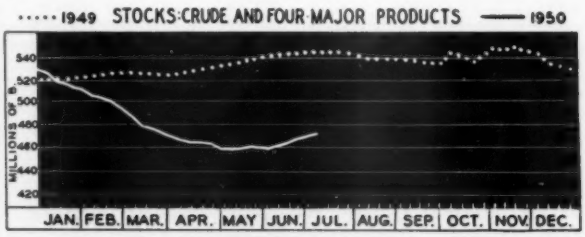
A.P.I. REFINERY REPORT, JULY 8

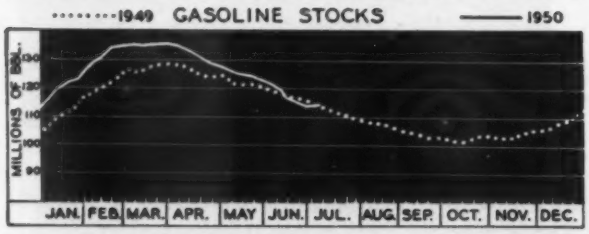
(Thousands of barrels)

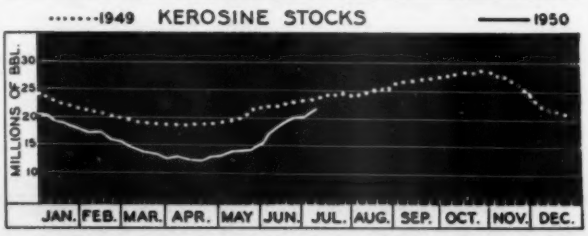
District—	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual	Bureau of Mines, July 1949: Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	987	416.1	31.6	187.9	209.3	26,523	7,638	14,759	10,050	745	319.2	23.3	155.4	161.7
Appalachian:														
District 1	105	43.0	3.4	14.4	9.9	2,436	427	607	366	87	40.7	2.7	11.4	8.9
District 2	64	30.0	3.0	8.3	12.6	961	145	224	230	64	35.4	1.3	6.0	12.0
Ind., Ill., Ky.	1,074	577.7	53.3	159.1	156.1	22,875	4,215	8,960	3,851	895	492.3	42.9	122.0	117.1
Okla., Kans., Mo.	498	267.3	10.0	99.1	54.3	11,494	1,191	5,167	1,336	427	238.0	17.9	82.3	57.6
Inland Texas	213	152.9	10.2	30.3	44.0	3,348	490	1,134	784	227	156.4	12.3	18.2	49.3
Texas Gulf Coast	1,310	627.1	105.7	224.5	225.1	16,694	3,595	8,684	4,836	1,217	623.0	66.2	176.7	225.9
La. Gulf Coast	471	221.0	33.0	108.0	47.9	5,531	2,576	3,065	1,781	404	212.4	38.0	88.0	45.3
N. La. and Ark.	74	28.0	4.7	18.0	13.7	2,534	457	616	220	73	31.3	5.1	11.2	14.9
Rocky Mountain:														
New Mexico	13	7.6	0.4	1.7	3.0	108	25	66	39	12	6.7	0.2	2.3	3.2
Other Rocky Mtn.	198	89.0	4.6	39.0	32.6	4,621	393	1,427	700	175	76.8	4.5	29.8	33.5
California	905	403.9	—9.6	160.1	322.4	17,153	883	11,839	17,681	847	381.0	10.6	131.2	310.9
July 8, 1950	5,912	2,865.6	250.3	1,050.4	1,130.9	114,278	22,035	56,568	41,874	5,173	2,613.2	225.0	834.5	1,040.3
July 1, 1950	5,854	2,785.3	309.9	1,083.1	1,048.7	114,139	21,229	53,335	40,542	.....	.....	.....	.....	.....
July 9, 1949	5,201	2,651.3	226.6	824.0	1,125.6	113,763	24,065	66,620	67,136	.....	.....	.....	.....	.....

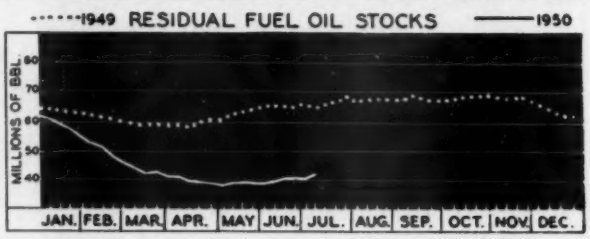
*At refineries including natural blended. †Finished and unfinished.

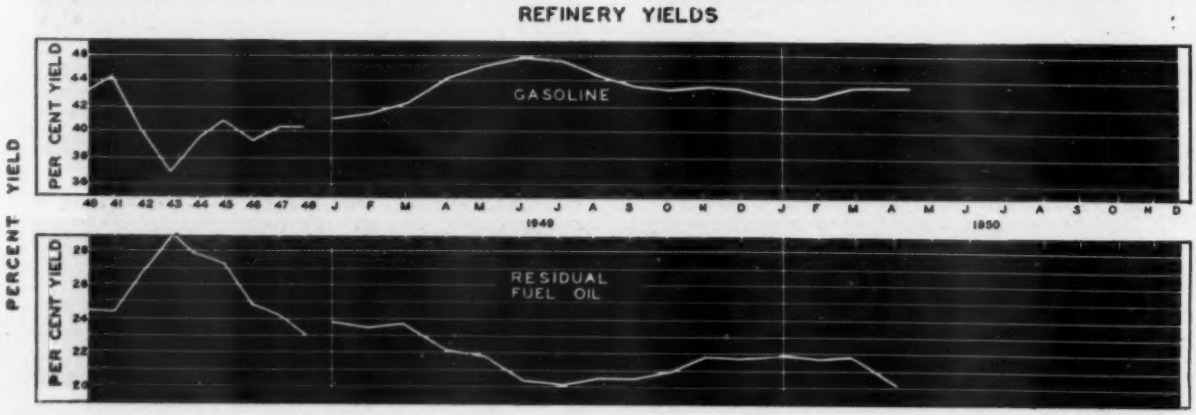












CRUDE PRICES

GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.63	....	....	....
19-19.9	1.72	....	....	....
20-20.9	1.80	$2.25	....	$2.12
21-21.9	1.89	2.27	....	2.14
22-22.9	1.97	2.29	....	2.16
23-23.9	20.6	2.31	....	2.18
24-24.9	2.14	2.33	$2.56	2.20
25-25.9	2.23	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.75
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

DESPITE the all-time high for refinery operations during the week ended July 10 and the midsummer increase in gasoline stocks, product markets remain firm in all areas.

Kerosine and No. 2 distillate fuel prices moved up 0.125 cent a gallon on the Group 3 market bringing the kerosine low to 8.375 cents and No. 2 fuel to 7.5 cents. No changes were reported on the high side of the spread.

The rapid increase in distillate stocks for the country as a whole has not been due to a lack of interest on the part of the buyers but to the reluctance of suppliers to move distillate fuels at current prices. Distillate stocks are still 10,000,000 bbl. less than at this time last year.

Inquiries for distillate fuels have been heavy in the Group 3 area for the past few weeks and the price increase may result in improved movement to reseller and consumer storage. Some buyers believe that the low point for summer prices has passed and that the consumer or reseller who has not bought or contracted for his next winter's fuel supply has stayed out of the market a few weeks too long.

Natural gasoline moved up another 0.25 cent a gallon in two increases of 0.125 cent each during the week. Current posting for 26-70 natural on the Group 3 market is 5.625 cents a gallon, still 0.25 cent below the level from which it fell in February.

Socony-Vacuum Oil Co. increased its tank-wagon prices of gasoline early last week in most of its eastern marketing territory. By the end of the week, the New York Harbor barge price had been raised 0.25 cent to 12.50 cents by at least one independent. Opinions vary as to whether the increase will become general.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotation of leading suppliers as of July 17, 1950. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12.25-12.5	10¾-11½
Premium gasoline, 86-88 octane	10¾-11½	13.25-13.5	11½-12¼
42-44 w.w. kerosine	8⅜-8½	9.1	8-8½
No. 2 straw fuel oil	7½-7⅝	7.6-8.0	7-7¼
No. 6 residual	$1.60-1.70	$2.15	$1.75-1.80

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5⅝	5⅛	5⅜
Grade 18-55	6.75	6.25	6.5

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11.5
750 vis., No. 3-4 neutral	13.75
2,000 No. 5-6 neutral	15.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	19.5-20
200 vis., No. 3 neutral, 0-10 pp.	13.5

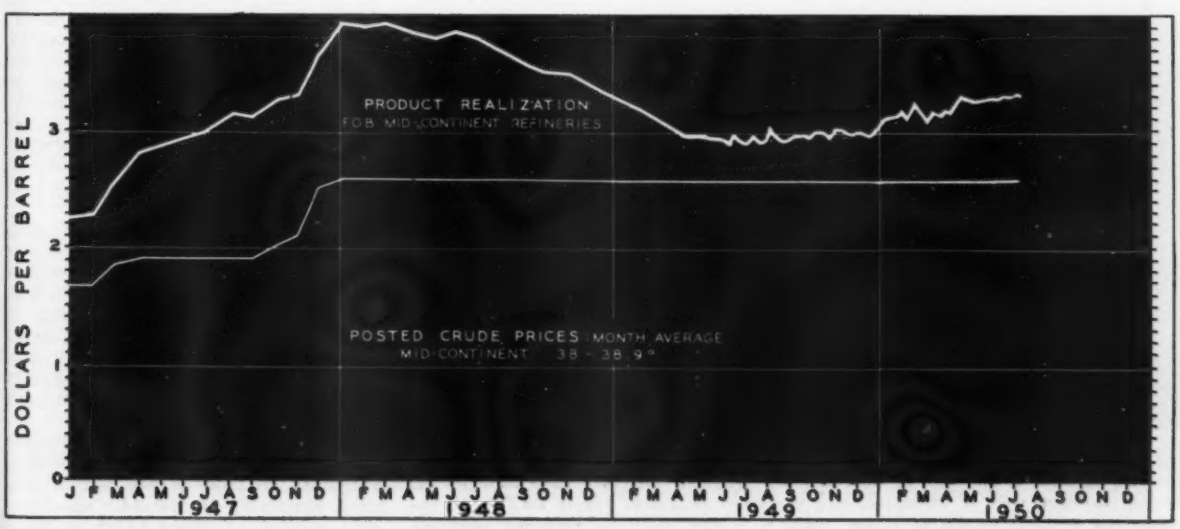
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	22.5
180 vis., 0 p.t. neutral	23

WAX

Mid-Continent

132-134 A.M.P.	4.50


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES 1 MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
J F M A M J J A S O N D
1947
J F M A M J J A S O N D
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
1950

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.31 for week ended July 8, $3.35 for previous week, and $2.97 for July 1949.

XUM

EQUIPMENT MEN . . . in the News

Rockwell Names Executives In Meter, Valve Division

W. F. Rockwell, Jr., president of Rockwell Manufacturing Co., has announced the appointment of L. A. Dixon, Jr., as assistant vice president of the company's meter and valve division, and A. J. Kerr, vice president of sales for meter and valve division, has announced the appointment of Clarence E. Muehlberg as sales manager of gas products.

C. E. MUEHLBERG

L. A. DIXON, JR.

Dixon, who started in the engineering department of Pittsburgh-DuBois Co., and became assistant general manager when that company was acquired by Rockwell in 1947, will assist in the coordination of sales and factory problems.

Muehlberg received his degree in mechanical engineering from Missouri School of Mines and has been affiliated with the gas industry for 30 years, serving with such companies as Public Service Co. of Colorado as sales manager of the industrial gas department, and Consolidated Edison Co. of New York where he attained the position of assistant manager, station construction and shops department.

Wilson Supply Acquires Bryan Gas-Lift Equipment

Wilson Supply Co., Houston, through its president, Wallace D. Wilson, has announced it has acquired the distribution of a line of Bryan gas-lift equipment. This equipment will now be known as Wilson-Bryan gas-lift equipment and augments the "Nixon surface control gas-lift system," manufactured and distributed by Wilson Supply.

Among recent developments in Wilson-Bryan gas-lift valves are: a method of producing wells with bellows-type flow valves whereby the highest gas pressure is utilized at the lowest valve in the tubing string, and rate of production is controlled by selective operating depth and a clock-controlled surface intermitter; a system whereby a series of bellows-type flow valves can be removed from the tubing string without pulling tubing; and a bellows valve that is directly controlled by the fluid head in the tubing. This valve operates independent of casing pressure and does not require a clock-controlled surface intermitter.

New Officers of Supply Group Assume Control

Ted Sutter, vice president of Baker Oil Tools Co., Inc., Los Angeles, is congratulated upon his election as president of the Petroleum Equipment Suppliers Association by the retiring president, Guy A. Thompson, vice president, Bethlehem Supply Co., Tulsa. Onlookers are Wharton Weems of Vinson, Elkins & Weems, who was reelected treasurer; F. M. Mayer, president of Continental Supply Co., elected a vice president of P.E.S.A.; and H. R. Safford, Jr., Petroleum Equipment Suppliers Association, who was reelected executive secretary.

Mine Safety Appliances Dedicates New Laboratory

Mine Safety Appliances Co., Pittsburgh, Pa., recently dedicated the John T. Ryan Memorial Laboratory, which, according to the firm, is the world's largest research laboratory devoted to the development of safety equipment for all industries.

The recently dedicated John T. Ryan Memorial Laboratory.

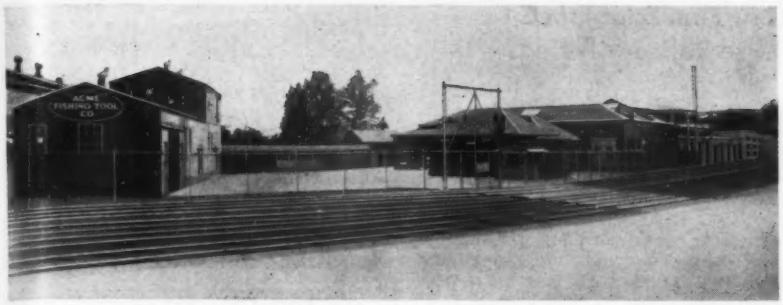
Principal speaker at the opening ceremonies was Ned H. Dearborn, Chicago, president of the National Safety Council. John T. Ryan, for whom the laboratory was named, died in 1941. He was cofounder of Mine Safety Appliance Co. with its present president, George H. Deike.

Facilities of the new building include a comprehensive library covering the fields of safety and industrial health and hygiene. Many types of research instruments and equipment such as high-altitude chambers; dust, fume, and gas chambers; a wind tunnel, and an electron microscope, are installed in the four-story structure.

Baroid Wins N.I.A.A. Award For Advertising Campaign

In the 1950 industrial advertising competition, conducted by the National Industrial Advertisers Association at its national convention in Los Angeles, the advertising campaign of Baroid Sales Division, National Lead Co., was awarded second place in the petroleum division, a close runnerup to the first-award winner, Standard Oil Co. of California.

That this award of excellence really has national significance, it is only necessary to look at the list of entries, according to Baroid's advertising manager, Arthur Langton, who points out that the 207 entries in the competition form practically a "blue book" of American industry.



Acme's present plant at Parkersburg is the result of 50 years of active service to the cable-tool drilling industry.

Acme Celebrates Golden Anniversary This Year

Acme Fishing Tool Co., Parkersburg, W. Va., is celebrating its fiftieth anniversary this year. Established in 1900 at Salem, W. Va., by George L. McKain, the firm has grown from a one-man operation in a small machine shop, to its present status, with offices, branches, or warehouses wherever cable-tool drilling is employed.

In 1895, McKain was a drilling contractor operating 18 strings of cable tools from his headquarters at Smithfield, W. Va. With his nearest supply store 25 miles away, at Mannington, W. Va., delays occasioned by frequent fishing jobs were costly, so he decided in 1896 to make his own tools. His shop consisted principally of a forging hammer, lathe, shaper, drill press, and accessories. He intended that his production should be confined to his own purposes.

L. M. LUDLOW

K. L. ELLIOTT

In 1899 he disposed of his contracting business in preparation for manufacturing fishing tools and furnishing fishing services, at which he had become an expert. In 1903 the business moved to Parkersburg and was incorporated as a West Virginia firm.

Lewis M. Ludlow, a son-in-law of the founder, became Acme's president and general manager in 1918 upon the death of McKain and is still serving in that capacity. Karl L. Elliott is treasurer and general sales manager of Acme and is president of Pattin Manufacturing Co., an affiliate of Acme at Marietta, Ohio, and has served with the firm for 30 years. Walter P. McKain, chief of the engineering department and son of the founder, has served 14 years with the company. A. D. McTaggart, who has been with Acme for 36 years, is now serving as plant superintendent.

Richards-Conant Named by United Centrifugal Pumps

Richards-Conant, Denver, has been appointed to represent United Centrifugal Pumps, Division of United Iron Works, according to an announcement from the manufacturer's office in Oakland, Calif.

The Denver organization is headed by J. A. Richards and A. B. Conant. Richards has long been associated with oil and mining activities in the area, and operated Manufacturers Sales Agency prior to formation of the present company. Conant was associated for over 20 years with a San Francisco manufacturer's representative.

United has specialized for over 25 years in the design and manufacture of pumps for refinery, processing, pipe line, boiler feed, and other specialized services.

Richards-Conant operates in New Mexico, Wyoming, Colorado, Montana, and in western portions of South Dakota, Nebraska, and Kansas.

J. C. Chase Named Manager Of New Marley Department

Jim C. Chase has been named manager of the recently expanded DriCooler sales department of Marley Co., Inc. He has been located at the general offices in Kansas City, Kans., since joining the company late in 1948. Before coming to Marley he was the Southwest district manager for Aerofin Corp., working out of Dallas. He received a degree in mechanical engineering from Purdue University.

C. H. Currier Elected T.E.M.A. President

C. H. Currier was elected president, and W. C. Beekley, vice president, at the annual meeting of Tubular Exchanger Manufacturers Association, Inc., held recently at Skytop, Pa. George P. Byrne, Jr., remains secretary-treasurer.

Currier is president of Ross Heater & Manufacturing Co., Inc., Buffalo, a division of American Radiator & Standard Sanitary Corp. Beekley is president of Whitlock Manufacturing Co., Hartford, Conn.

The following comprise the new executive committee: T. H. Miley, Foster Wheeler Corp., New York; G. A. Worn, Lummus Co., New York; Currier and Beekley.

At this meeting, Engineers & Fabricators, Inc., Houston, was welcomed as a new member.

T.E.M.A. is an association of tubular exchanger manufacturers, formed

Cameron Demonstrates L-P Valve at Tulsa

Ames Bliss, sales engineer, Cameron Iron Works, Inc., at a demonstration staged at the Mayo Hotel in Tulsa, points out the nonlubricated, all-forged steel, stainless trim features of the new Cameron all-purpose, lift-plug valve to a group of operating and supply men in the Tulsa area. Demonstrations were held on three successive nights beginning July 10. Other Cameron men assisting Ames at the meeting were Jack Harris, sales manager, valve division; V. G. Ibert, salesman; R. F. Farmer, assistant general sales manager, all of Houston; and Paul Edkin, Tulsa, Mid-Continent division manager.

XUM

several years ago for the purpose of establishing and maintaining highest possible standards in the design, fabrication, and performance of shell-and-tube heat-transfer equipment.

Ryburn Made Sales Manager Of Seamless Products

W. R. RYBURN

W. R. Ryburn has been appointed manager of sales, seamless products, for the Spang - Chalfant Division of National Supply Co., according to E. A. Booth, Spang-Chalfant's general manager of sales. Ryburn will make his headquarters in Pittsburgh. For the past 3 years he has been manager of National Supply's drilling-equipment sales at the company's general sales offices, Toledo. He started with National Supply in 1928 and for 10 years served in various sales capacities in the Montana and Wyoming oil fields. In 1938 he was transferred to the general sales department at Toledo. Ryburn attended University of Michigan and upon leaving that school was employed by The California Co. in Montana and worked for various drilling contractors in Montana and Wyoming from 1924 to 1928. He succeeds R. M. Burk, who recently left the company to enter the oil business.

Cushing Made Manager of Drilling Equipment Sales

W. T. CUSHING, JR.

W. T. Cushing, Jr., has been appointed manager, drilling equipment sales for National Supply Co., according to an announcement by R. W. Gordon, manager, oil-field sales, for the company.

Cushing, a graduate of University of Michigan, joined National in 1940. He spent 5 years in the engineering and sales departments at the company's Toledo and Torrance plants and 2½ years as production equipment engineer in the plant products division, Houston.

In 1947 he was transferred from Houston to Casper, Wyo., as division engineer of National's Northwest and Canadian districts. Later he became division sales manager for the same territory, which position he held until his present appointment. He succeeds W. R. Ryburn, just appointed manager of sales, seamless products, for Spang-Chalfant Division of National Supply.

New Firm Established to Make Refinery Fittings

Burkhart Engineering Co. has been established to design and manufacture oil-refinery fittings. Merle E. Burkhart is president of the new firm which has offices at St. Louis. Burkhart, a mechanical engineer, was with Key Co., East St. Louis, Ill., manufacturers of oil-refinery fittings, as chief engineer and vice president from 1937 to 1945. He has been with K. P. Wesseling Co., machinery dealer, St. Louis, since December 1945.

Incorporators of the new company are M. E. Burkhart, K. P. Wesseling, and H. H. Stern. Officers are: Wesseling, vice president and treasurer; H. H. Stern, secretary; W. W. Blase, assistant secretary. Sales manager, West Coast office, is H. Schlarman, Hollywood, Calif.

Bain Named as Kelley Sales Representative

G. V. BAIN

W. M. Eliot, general manager of Kelley Manufacturing Co., Houston, has announced the appointment of George V. Bain as an industrial sales representative.

Recently with Brinkman, Inc., tank and pipe fabricators, Bain was before that an engineer with Big Three Welding Equipment Co. During the war he was a production engineer with Brown Shipbuilding Corp.

Chiksan Names Five New Representatives

Appointment of five new Chiksan representatives has been announced by G. R. Winder, vice president and sales manager, Chiksan Co., Brea, Calif. Robert S. Hudgins, Jr., Charlotte, N. C., will cover North and South Carolina. R. S. Stover Co., Marshalltown, Iowa, has been appointed to cover the states of Iowa and Nebraska. Geo. S. Thomson Co., Inc., Phoenix, Ariz., will cover the state of Arizona. Jos. W. Eshelman & Co., Inc., Birmingham, will cover Alabama and parts of Tennessee and Florida, and Rittelmeyer & Co., Inc., Atlanta, Ga., will cover the entire state of Georgia and a part of Florida.

Republic Announces Two Management Changes

J. H. LOLLAR, JR.

Republic Supply Co. has announced several changes in management. J. H. Lollar, Jr., will assume the duties of president and H. B. Catlow will become vice president in charge of sales. Both Lollar and Catlow will continue to serve on the board of directors.

Republic Supply, now celebrating its fortieth anniversary of service to the oil and gas industries, operates 47 service points in 9 states from its headquarters in the National Standard Building in Houston.

Mullis to Manage Du Pont Petroleum District Office

Appointment of Alfred R. Mullis as manager of the Gulf Coast district office of the Petroleum Chemicals Division of E. I. du Pont de Nemours & Co., Inc., with headquarters in Houston, has been announced by Ray E. Miller, division director.

Mullis, a graduate in chemical engineering from Rice Institute in Houston, has been with Du Pont since 1947 as a Petroleum Chemicals Division service representative in the Gulf Coast district. Following graduation from Rice in 1938, Mullis was employed in the research and development department of Humble Oil & Refining Co. at Baytown, Tex.

Fisher Governor Holds Seventieth Anniversary Sales Meet

Fisher Governor Co. recently held a 3-day international sales meeting at the home office and factory in Marshalltown, Ia., attended by 125 representatives and sales engineers from Fisher offices throughout the United States, Canada, and Mexico. The year 1950 marks Fisher Governor Co.'s seventieth anniversary.

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FOR SALE—10,000 new J-55—8 round thread couplings. Will sell any amount at $1.65 each loaded in railroad car. Stanford Engineering Company, Salem, Illinois. Phone 552.

FOR SALE: 4000′ 6⅝″ O.D. water well casing. Good couplings and threads. Price 7½c. M. J. Regan, Coffeyville, Kans.

FOR SALE: 300 Amp Westinghouse welding machine powered by 6-BK Waukesha engine. Completely overhauled. Less than 50% of new price. Melton Supply Company, Box 1360, Seminole, Oklahoma.

STORAGE TANK: Horizontal, 9 by 25′, ¼″ plate welded. 12,500 gallons. Good as new. Price $500.00. M. J. Regan, Coffeyville, Kans.

CORE-DRILL Equipment for Sale: Two "Franks" truck mounted core drills, 2,000′ capacity, mounted on RK-11 International trucks. Two KB-7 International oil field trucks with oil field beds, rolling tailgates, gin poles, and Model 34 Tulsa winches. Three pole trailers with bolsters, two equipped with dollies for holding pipe loads. Three 750 gallon water tanks, skid mounted. Two 300 gallon tank trailers. Contact Mr. J. D. Baker or Mr. W. H. Hawkes, P.O. Box 1654, Oklahoma City, Oklahoma. Telephone No. 2-6381.

FOR SALE

Hydraulic Casing Pulling Units, Hydraulic Jacks, Casing Spiders, Rings & Slips. Also,
Skid Mounted Cementing Unit, Complete. Write or Call

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Phone 780 Ada, Okla. P. O. Box 937

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THREE IN ONE DRILLING COMPANY
Russell, Kansas

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FOR CABLE TOOLS
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WELL equipment. New and used spudders, rotaries, core drills, all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools rented. Everything for well service. Pressey & Son, Pueblo, Colo.

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FOR SALE: Oilwell Mudpump, 7¼-14, Mission Equipped, $650. Uniontool Rotary Table roller bearing throughout, $350. Both overhauled, good shape. Box 106, Seminole, Okla.

FOR SALE: One Gumbo Buster 26″ Oil Bath rotary table in good running condition. Attractive price. Melton Supply Company, Box 1360, Semniole, Oklahoma.

Several Army Surplus 4½″ x 6″ Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

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A-86064—Houston, Texas

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WILSON Mogul Draw Works Unit with compound powered by International UD-18 Motor complete with 55-foot double telescoping mast ready to use. Two Traveling Blocks and Hooks, Rotary, 4-foot Substructure. All in good condition. Real Bargain at only $6000.00. Contact D. C. Bonnet Trucking Co., New Iberia, La.

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Gaso, Byron Jackson, Aurora, Wayne, Lombard & Hale Fire Pumps with Engines, 1½ to 25 KW Generator Sets or Light Plants, Engines, Suction Hose, Fire Hose, Victaulic Couplings & Etc. Write for listing. H. A. McCarthy, 310 Thompson Bldg., Phone 5-3296, Tulsa, Oklahoma.

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Marietta, Ohio
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First Class Used Casing—Lapweld—Low Prices
10¾″ O.D.—8⅝″ O.D.—7″ O.D.—5½″ O.D.
2″ 4½# tubing, both regular and upset.

FOR SALE

16—7¾″ x 14″ Clark cast iron, double acting, compressor cylinders. Type VTH, discharge pressure 800# p.s.i. 4″ intake and discharge. Serial numbers 15302 to 15317, inc. These are used cylinders and have been in operation two years.

THE OHIO FUEL GAS COMPANY
99 N. Front St., Columbus, Ohio **R. A. Bacon, Manager of Purchasing**

FOR SALE—GAS, GATHERING OR FLOW LINES, GOOD FOR 1000# P.S.I.

Item 1. 25,000′ 3¼″ OD x .125/.160″ Wall 4.5# NEW SEAMLESS PLAIN ENDS, 16′ to 26′ LENGTHS.
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$100,000.00 STOCK OF PUMPS AT BARGAIN PRICES

CENTRIFUGAL PUMPS

2—Rex single stage, 7000 g.p.h., driven by one cylinder Wisconsin gasoline engine, mounted on rubber tired wheels.

2—B-J, Type H-SM, single stage, 165 g.p.m. @ 170′ head, direct connected to 10 hp, G.E., 220/440 v, 3 ph, 60 cy. induction motor.

2—B-J, Type H-SM, single stage, 125 g.p.m. @ 355′ head, direct connected to 20 hp, 220/440 v, 3 ph, 60 cy. totally enclosed, fan cooled motor.

2—B-J, Type H-SM, single stage, 800 g.p.m. @ 625′ head, direct connected to 125 hp, 3 ph, 60 cy, 440 v, totally enclosed, fan cooled motor.

2—B-J, Type H-SM, single stage, 125 g.p.m. @ 228′ head, direct connected to 10 hp, 220/440 v, 3 ph. 60 cy. totally enclosed, fan cooled motor.

2—B-J, Type 6STGMX, 6 stage, 250 g.p.m. @ 1300′ head, direct connected to 75 hp, 220/440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

1—B-J, Type BM, single stage, 350 g.p.m. @ 150′ head, direct connected to 20 hp, 220/440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

2—B-J, H-SM, single stage, 350 g.p.m. @ 227′ head, direct connected to 25 hp, 220/440 v, 3 ph, 60 cy. totally enclosed fan cooled motor.

1—B-J, Type LSM, single stage, 235 g.p.m. @ 304′ head, direct connected to 25 hp, 220/440 v, 3 ph, 60 cy, totally enclosed fan cooled motor.

2—B-J, Type LSM, single stage, 435 g.p.m. @ 550′ head, direct connected to 75 hp, 220/440 v, 3 ph, 60 cy, totally enclosed fan cooled motor.

1—B-J, Type S, single stage, 1870 g.p.m. @ 327′ head, direct connected to Elliott turbine 104 hp, 275# inlet steam pressure, 40# exhaust, non-condensing.

2—B-J, Type S, single stage, 2200 g.p.m. @ 335′ head, direct connected to Elliott turbine, 129 hp, 275# inlet steam pressure, 40# exhaust, non-condensing.

2—B-J, Type SM, single stage, 290 g.p.m. @ 515′ head, direct connected to 60 hp, 220/440 v, 33 ph, 60 cy, totally enclosed, fan cooled motor.

2—B-J, Type SM, single stage, 125 g.p.m. @ 520′ head, direct connected to 50 hp, 220/440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

1—B-J, hydropress, Type 12L-8, 8 stage, 50 g.p.m. @ 1100′ head, direct connected to Coppus 19 hp. 275# inlet steam, 40# exhaust, non-condensing turbine.

1—B-J, Type H-SM, single stage, 120 g.p.m. @ 540′ head, direct connected to Elliott turbine, 40 hp, 275# inlet steam, 40# exhaust, non-condensing.

1—B-J, Type H-SM, single stage, 50 g.p.m. @ 388′ head, direct connected to 20 hp, 220/440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

2—B-J, Type L-SM, single stage, vertical split type, 70 g.p.m. @ 310′ head, direct connected to 20 hp, 220/440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

2—B-J, Type SM, single stage, 162 g.p.m. @ 100′ head, direct connected to 10 hp, 220/440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

1—Amsco Nagle, Type SW, vertical sump pump, 50 g.p.m. @ 58′ head, direct connected to 3 hp, 220/440 v, 3 ph, 60 cy. motor.

1—I-R, Type 2½ NT, horizontal split case, 4 stage, 300 g.p.m. @ 325′ head, direct connected to 100 hp, 440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

2—I-R, type 1½ CRVH, single stage, vertical split, 75 g.p.m. @ 139′ head, one direct connected to 1½ hp, 440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor and one to Elliott turbine 5 hp, type 2AY, 275# inlet steam, 5# exhaust.

1—I-R, single stage, 100 g.p.m. direct connected to 10 hp explosion proof, 220/440 v, 3 ph, 60 cy. motor.

2—I-R, sump pumps, type #25, direct connected to multivane air-motor.

1—I-R, Type #2 MRV-1S, 2 stage, 100 g.p.m. @ 125# P.S.I. head, direct connected to 15 hp, 220/440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

1—B-J, Type H-SM, single stage, 500 g.p.m. @ 304′ head, direct connected to 60 hp, 3 ph, 60 cy, 220/440 v, motor.

1—I-R, type #5-ALU, horizontal split case, single stage, double section, 1000 g.p.m. @ 125′ head, direct connected to 30 hp, 220/440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

2—Barton-American, fire pumps, 600 g.p.m. @ 120 P.S.I., driven by Ford V-8 engine mounted on rubber tired trailer.

2—I-R sump pumps, single stage, 200 g.p.m. @ 10′ head, direct connected to multivane air-motor.

2—United Iron Works, Type SAB, single stage, 570 g.p.m. @ discharge pressure and direct connected to 30 hp, 220/440 v, 3 hp, 60 cy, totally enclosed, fan cooled motor and one to Elliott turbine 30 hp, type 2AY, 275# inlet steam, 45# exhaust.

2—B-J, type VC, 2 stage, 440 g.p.m. @ 840′ head, direct connected to Elliott turbine, 87 hp, type 2AY, 275# inlet steam, 45# exhaust.

2—B-J, type H-SM, single stage, 98 g.p.m. @ 230′ head, direct connected to 10 hp, 220/440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

1—B-J, type 12L-8, hydropress, 8 stage, 50 g.p.m. @ 1100′ head, direct connected to 25 hp, 220/440 v, 3 ph, 60 cy, totally enclosed, fan cooled motor.

2—B-J, type L-SM, single stage, 270 g.p.m. @ 366′, one direct connected to 7½ hp, 220/440 v, 3 ph, 60 cy, explosion proof motor and one to Elliott turbine, type 2AY, 28 hp, 275# inlet steam, 45# exhaust, non-condensing.

1—Amsco-Nagle, single stage, vertical shaft, type SW, 55 g.p.m. @ 20′ head, direct connected to 1½ hp, 220/440 v, 3 ph, 60 cy, motor.

1—I-R, type #5ALV, horizontal split case, single stage, double suction, 1000 g.p.m. @ 125′ head direct connected to 30 hp, 220/440 v, 3 ph, 60 cy totally enclosed, fan cooled motor.

2—B-J, type 41"S", horizontal split case, single stage, 500 g.p.m. @ 175′ head—no drive on one, one direct connected to Coppus turbine, 7½ hp, 275# inlet steam, 45# exhaust.

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2—Union Steam Pump, 8x6x8, simplex.

2—Union Steam Pumps, 6x3½x6 duplex, piston type.

1—Union Steam Pump, 6x4x6 duplex, piston type.

MISCELLANEOUS PUMPS

1—Watson-Stillman, hydraulic, pressure testing pump, type 240A, fig. 8, 2000# /sq. inch, manual, ¾" connections.

1—Deming, hydraulic, single action, model #594, 400# /sq. inch, ¾" connections.

2—Schutte-Koerting, steam jet, vacuum pump, single stage, size 3.

1—Hills-McCanna, proportionating, type HB 2¼", fig. C-70, plunger type, stainless steel, cast steel body, 2.3 g.p.m. max. capacity, single stroke, ratchet drive with Boston type TB-40 geared speed reducer, driven by 2 hp, 440 v, 3 ph, 60 cy, explosion proof, fan cooled motor.

1—Hills-McCanna, type LM-10, single stage, 29.2 g.p.m., ratchet drive, H-M speed reducer drive, ½ hp, 110 v, 60 cy, single phase, explosion proof motor.

2—Schutte-Koerting steam jet vacuum pumps, size 1½", type S, single stage, 1½" connections.

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V-1710-49 and V-1710-53 12 cyl. Allison engines. 1000 HP. No time since overhaul. Less nose gear. Can be converted to natural gas.

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2 New Hydraulic Shot Hole Drill Rigs at Special Price. Capacity, 400' of 3" hole with 2⅜" drill pipe comprising 1½ ton Ford truck, 25' 6" tubular mast with double acting hydraulic rams to provide 10' continuous non-chucking stroke, hydraulic operated winch, hydraulic powered rotary table, hydraulic rotary table push down, G-D 4 x 5 mud pump, swivel, 49 sections of 2⅜" drill pipe 10' long and complete accessory equipment.

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3—6D-1742 Buda Diesel engines equipped with Twin Disc PTO, radiators & Belt Starting Bendix. FOB Odessa, Texas.

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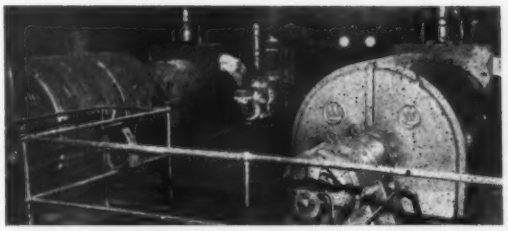

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This plant was equipped for the production of butadiene from petroleum gas by hydrogenation, recovery and purification. The Houdry Process is used for hydrogenation and designed capacity is 15,000 short tons of butadiene per year.

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1—INTERNATIONAL PA-100 Gas-Gasoline Engine, Oilfield type. 1—L-Type Star Spudder with sheer poles. **E. A. KELLY, BOX 861, OKLAHOMA CITY.** Phone 5-6407.

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Mayhew model 2000, mounted 4x6 G.M.C. Two 100 h.p. motors, 5x8 G.D. pump, 2000 ft. drill pipe. 4x4 Chevrolet water truck. Pole trailer, trailer mounted tool house and light plant. All necessary tools for complete job. First class condition, now working. Priced slightly over one-half of original cost. Call G. L. BUTLER, Phone 444-J, Riverton, Wyoming. P. O. Box 925.

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BOILERS. Combustion Engineering, VU Type, 600#, 750° FTT 140,000# steam evaporation per hr. NEW, Never Erected. Immediate Delivery. 2—B&W, 450# psig. 700° FTT, 50,000# evaporation per hr. NEW. 2—B & W Bent Tube, 300#, 100,000# evap. per hr. NEW. All in storage. Inspections by appointment. Low Prices. Investigate. Drawings on request. CHARLES WEAVER, 4145 Penobscot Bldg., Detroit 26, Michigan. Send for Boiler Bulletin No. 320.

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HELP WANTED

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Only Experienced Men Need Apply.

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College graduate not over 38. Practical selling experience as Salesman or District Manager. Retail Merchandising—retail selling administrative and general office sales promotional work. Creating and developing retail merchandising programs for dealer trade.

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THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

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Experienced ENGINEER familiar with Oil Refinery design and capable of estimating process equipment from flow diagrams.

Give full information, experience record and salary expected.

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ESTABLISHED Seismograph Company has opening for Party Chief. Two years minimum experience in charge of party and college degree in science or engineering required. This job offers adequate salary and profit sharing plan. Reply Box D-563, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Cable tool drillers and tool dressers on Bucyrus-Erie Spudder Machines, drilling water wells. Steady work. JOS. EGERER, Well Drilling Contractor, 1012 North Third Street, Milwaukee 3, Wisconsin.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

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ASSISTANT PROJECT ENGINEER
Work New York City for engineering, manufacturing, contracting firm. Engineering degree, 4 years oil refinery engineering experience required. Good future. Submit resume outlining experience, education, class standing, extra curricular activities, armed service records to Box D-591, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Rate man, by large natural gas Interstate pipe line company located in the Middle West. Must be accurate, have a pleasing personality and get-along ability. In reply state education, experience, age and salary required. Box D-600, The Oil and Gas Journal, Tulsa, Oklahoma.

OLD reliable Eastern manufacturer of oil production equipment desires contact with part time specialty salesman to present our line of Secondary Recovery equipment in all or part of Kansas, Oklahoma, and Texas. Write Box D-601, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING SUPERINTENDENT: Mid-Continent drilling concern will have opening August 15th for Assistant Drilling Superintendent; age 30 to 35, who has been in supervisory capacity for at least five years as Drilling Superintendent or Tool Pusher. Must have good personality; initiative; and fair educational background. In replying give past five year employment record; state age, marital status and salary expected. All replies handled strictly confidential. Box D-599, The Oil and Gas Journal, Tulsa, Oklahoma.

SOUTHWESTERN, inland, small refinery has need for man capable of taking complete charge of refinery operations. Salary commensurate with education, experience, and proven ability. Write Box D-594, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED BY INDEPENDENT OPERATOR Top wages for well completion and production expert with major company experience who has worked for independent in Illinois. Must be available immediately. Give age, education, experience, previous wages, references. Replies confidential. Box D-602, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GEOPHYSICIST: Master's degree as mining engineer—unusually varied experience—15 years with major oil company in North, Central, South America and the Far East as gravity and seismic party chief, geological interpreter and exploration supervisor; seeks position here or abroad. Box D-604, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MACHINIST: 13 years experience in shop and maintenance of compressors, reciprocating pumps, turbines, desires position with possibilities for advancement. Age 31, Box D-596, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

ACCOUNTANT-AUDITOR. Public accounting background. Now employed as assistant controller-office manager of independent refinery in Chicago area. Will relocate. Box D-578, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL WELL Equipment Manufacturers needing sales representative in Bradford, Titusville, Pa., and Bolivar, N. Y., Fields contact Bradford, Pa., man with intimate knowledge of producers and Supply Companies. Finest References. Reply Box D-582, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

FIFTEEN years experience in pipe-line operations, gaging, tank strapping, etc., and general movement crude oil. Can furnish references. Am 43, sober and single. Salary commensurate with regional pay. Available immediately. Reply Box D-575, The Oil and Gas Journal, Tulsa, Oklahoma.

PROGRESSIVE PLANT MANAGER for grease and lube oil plant. Fifteen years managerial experience—production control, product development, inventory control, purchasing, costing, personnel, traffic. Salary commensurate with position. Box D-542, The Oil and Gas Journal, Tulsa, Oklahoma.

EMPLOYMENT as seismologist. Bachelor degree in geology, 9 years' experience in seismograph work with same company, 5 years foreign, 3 years as party chief. Available immediately. Reply Box D-566, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER-GEOLOGIST, 34, family, 9 years experience major company Kansas, Oklahoma, Texas, Illinois, and Michigan. Desires change to active independent. Capable supervising all phases development and production. Box D-589, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT-OFFICE MANAGER: thirteen years experience in refining, production, drilling, transportation, marketing. Know taxes, insurance, finance and administrative. Age 34, married. Available immediately, any location. Replies confidential. J. C. Porter, 2520 Aloma, Wichita, Kansas.

ASPHALT refinery superintendent, 22 years general refinery experience, 8 years refinery superintendent desires position with small independent oil company with possibilities of working interest in refinery. Box D-597, The Oil and Gas Journal, Tulsa, Oklahoma.

TOOLPUSHER—Cable Tools, wants connection with Independent operator or contractor. Thirty years in field; furnish good references; sober and reliable. Thoroughly experienced drilling and completion work; some production experience. Can and will go anywhere for right connection. Box D-598, The Oil and Gas Journal.

EXPERIENCED OIL MAN wants connection. Seven years major company petroleum engineer and production foreman. B.S. and M.S. degrees, California Institute Technology. Age 35, healthy, married, good habits, best references. Address: Engineer, 247 La Colina Drive, Bakersfield, California.

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FOR lease or rent 3030 square feet attractive office space in Frates Building, Odessa, Texas. Modern, air-conditioned and parking space. On lease basis, will arrange floor space to suit tenant. C. L. Frates, 1101 First National Building, Phone 2-6301, Oklahoma City, Oklahoma.

FOR SALE—MAPS

FOR SALE

Land department maps in roller cases covering most of Mid-Continent area—formerly used by Barnsdall Oil Company. Maps may be inspected at: Room 824, Petroleum Building, Tulsa, Oklahoma.

ROYALTIES

1400 ACRES, ¼ royalty oil and gas, Southern Le Flore County, cheap. Z. J. Harrison, Poteau, Oklahoma.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

ELK CITY POOL—(Oklahoma)
Royalties at bargain. A. S. Berry, owner, 822 Wright Building, Tulsa, Oklahoma. Phone 5-5402. Investors with capital solicited.

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Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

LEASE AND DRILLING BLOCKS

13 WELLS, 110 acre lease shallow producing from 700' Berea, near Ashland, O. Many good locations, low cost terms. E. N. Rehler, Allegany, N. Y.

MONTANA leases for sale. Carter Oil drilling good test on Big Poplar Structure in NE Montana. Also Murphy Oil to drill Devonian test on same structure. I have 7500 acres in scattered blocks on the same structure. Will consider selling 1% override also. A. C. Hornung, Consulting Geologist, 1241 Howard, Billings, Mont. Ph. 9-1502.

LARGE block North Carolina ready for drilling contract. Write: Post Office Box 7043, Tulsa, Oklahoma.

OFFERING 32000 10 yr. oil and gas fee leases at $1.25 per acre in Western Nebraska County where oil play is hot right now. Box 2181, Denver, Colo.

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4000 Acres of freehold oil rights widely scattered throughout Central and Northern Alberta for sale or lease, as a unit. For particulars:

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FOR SALE: Oil and Gas Leases and Drilling propositions in Shallow territory of Allen, Simpson, and Warren Counties, Kentucky, W. P. Harley, Bowling Green, Kentucky.

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IF you've got real oil proposition or royalty that you wish to sell, or any defaulted municipal or special assessment bonds, bring your deal to me. Dyer-OJ, 1835 Champa, Denver, Colorado.

MANUFACTURERS REPRESENTATIVE

WANTED: Manufacturers' representative for established line of oil well pumping equipment and specialties for the states of Colorado, Wyoming, Montana, and Western Canada. Give experience and list of present manufacturers represented. Write Box D-579, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED

WANTED: Settled sand production. Send details first letter. Reply P. O. Box 2161, Cincinnati 1, Ohio.

WANT OIL, GAS lease or interest in royalty: San Luis Obispo, Monterey Counties, California. Mail description data to Box D-592, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: SURPLUS Chemicals, Oils, Waxes, Solvents, Wastes and Residues of all kinds. Chemical Service Corporation, 98-06 Beaver St., New York 5, N. Y.

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PRODUCTION FOR SALE

FOR SALE: 40 bbls. sand production, 2 wells, and five undrilled locations near Tulsa. 40 gravity oil, new equipment. Price $35,000.00 for quick sale. P. O. Box 26, Tulsa, Oklahoma.

PRODUCTION WANTED

WE ARE INTERESTED in purchasing marginal or semi-marginal production in Permian Basin for Cash or terms. Please send complete details to Box D-543, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa, 3, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorney, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

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WANT about $5,000 for small refinery deal in Montana. Abnormal returns from investment. Details — Box 2181, Denver, Colo.

FOR SALE: Well equipped Oil Field Machine Shop consisting of Hollow Spindle Lathe, 3 Engine Lathes, Boring Mill, Portable Welding Equipment, Bucking Machine, Gauges and everything for a complete Oil Field Machine Shop. This shop could not be replaced for $100,000.00. Doing $10,000.00 to $13,000.00 per month. Asking price $50,000.00. Box D-584, The Oil and Gas Journal, Tulsa, Oklahoma.

Indiana Fields

(Continued from page 148)

1 Johnson, SE NE NW 3-5s-13w, dry, TD 3,077 ft.

Spencer County: L. L. Benoist 1 Yeager, SE SW SE 28-6s-7w, dry, TD 996 ft.

Sullivan County: S. D. Jarvis 1 Lane, SE SE NE 8-9n-9w, dry, TD 2,419 ft.

Vigo County: H. R. Snavely, SW SW SW 26-10n-9w, dry, TD 125 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Webster County: Sun Oil Co. 1 Bridwell, NW NW SE 22-N-23, IP 26 bbl., Palestine 1,616-32 ft., TD 2,273 ft. (New pay zone.)

EASTERN KENTUCKY

ASHLAND.—In Big Sandy gas field, Kentucky West Virginia Gas Co. has completed a good well at 5930 James Ramey, located in Pike County on Sukey Creek. At total depth of 2,270 ft. well gaged 1,639,000 cu. ft. of gas daily from Big Lime (Mississippian) 2,009 to 2,225 ft. Well was not shot or acidized. Other completions by the same company in same field include: 592 Charles Short, Brannon Branch, Knott County, 75,000 cu. ft. gas from Devonian black shale 2,270 to 3,174 ft., total depth; 951 Evans Oil & Gas Co., Nats Creek in Lawrence County, dry and abandoned in Devonian black shale at total depth 2,522 ft.

In Ida May pool of southern Lee County, Petroleum Exploration Co. has completed 1 Chester Gourley Heirs for 10 bbl. oil per day in Corniferous lime at total depth of 1,125 ft. In same pool Doug Parrish, Jr., is testing 18 David Mays after shooting Corniferous lime 1,033 to 1,110 ft., total depth.

EASTERN KENTUCKY WILDCAT FAILURE

Carter County: A. H. Carpenter 1 J. W. Whitt, 13-W-78, dry, TD 3,707 ft., Berea ½00 ft., Corniferous 1,207 ft., Brassfield 1,750 ft., Tyrone 2,830 ft., St. Peter 3,407 ft., 105,000 cu. ft. gas natural, Knox 3,418 ft., hole full water.

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Oklahoma Fields

(Continued from page 149)

Murray County: Aladdin Petroleum et al. 1 Miller, NE SE SW 11-1s-2e, elev. 934 ft., dry, TD 5,312 ft., Chimney Hill 3,222 ft., Sylvan 3,236 ft., Viola 3,478 ft., Simpson 3,836 ft., first bromide sand 4,070 ft., second bromide sand 4,098 ft., Tulip Creek 4,426 ft., McLish lime 4,530 ft., McLish sand 4,724 ft., basal Oil Creek sand 5,291 ft.

Okfuskee County: Herndon Drilling and Gulf 1 Castle, NE NE NW 35-13n-8e, 1½ mi. S Rosenwald, elev. 801 ft., dry, TD 3,588 ft., Big lime 2,158 ft., coal 2,357 ft., Senora sand 2,392 ft., Earlsboro 2,760 ft., Inola 2,928 ft., lime 3,130 ft., Booch 3,271 ft., Gilcrease 3,380 ft., sand 3,451 ft., Union Valley 3,519 ft., Pitkin 3,569 ft.

Oklahoma County: Warsaski et al. 1 Lambeth, NE NE SE 22-14n-1w, ⅝ mi. SW of NE Arcadia, est. elev. 1,013 ft., dry, TD 5,930 ft., Pawhuska 2,630 ft., Avant 3,750 ft., Hogshooter 4,309 ft., Checkerboard 4,590 ft., Oswego 5,096 ft., Woodford 5,504 ft., Hunton 5,580 ft., Sylvan 5,600 ft., Viola 5,712 ft., dense 5,737 ft., dolomite 5,799 ft., first Wilcox 5,840 ft., second Wilcox 5,916 ft.

Okmulgee County: Thompson Bros. et al. 1 Kennedy, NE SE SE 19-16n-11e, Pickett Prairie, dry, TD 875 ft., no tops reported.

Pontotoc County: Bouse-Showalter 1 Reed, NE NE NW 19-4n-4e, elev. 1,094 ft., dry, TD 2,300 ft. in Pennsylvanian, Belle City 1,414 ft.

Smyth & Criswell et al. 1 Boring, SW NW SE 29-4n-6e, dry, TD 1,730 ft., no log.

Seminole County: W. A. Villines et al. 1 Reed, SW NE NW 19-7n-6e, ⅞ mi. NE Hazel district, dry, TD 3,023 ft., Calvin 2,512 ft., Earlsboro 3,011 ft.

Stephens County: T. H. McCasland 1 Gregston, NW NE NE 33-1n-8w, elev. 1,081 ft., dry, TD 4,970 ft., Canyon lime 4,310 ft.

Tillman County. Cassidy & Wilson Oil 1 Cassidy, NW SE NE 35-2s-18w, elev. 1,242 ft., dry, TD 3,906 ft., Canyon 2,360 ft. with slight show of oil, lime 3,011 ft. and 3,509 ft., dolomite 3,792 ft.

CALENDAR

July

Pacific Coast Gas Association, annual convention, Seattle, Wash., July 31-August 3.

August

Interstate Oil Compact Commission, summer meeting, French Lick, Ind., August 3-5.

September

National Chemical Exposition, Chicago Coliseum, Chicago, September 5-9.

American Institute of Chemical Engineers, regional meeting, Minneapolis, September 10-13.

American Society of Mechanical Engineers, and Instrument Society of America, Municipal Auditorium, Buffalo, N. Y., September 11-15.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 13-15.

Instrument Society of America, annual instrument conference and exhibit, Municipal Auditorium, Buffalo, N. Y., September 18-22.

American Society of Mechanical Engineers, petroleum mechanical engineering conference, Roosevelt Hotel, New Orleans, September 24-28.

October

American Gas Association, annual convention, Atlantic City, N. J., October 2-.

Mid-Continent Oil and Gas Association, Texas division, Dallas, October 4-5.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, Mid-Continent meeting, Roosevelt Hotel, New Orleans, October 4-6.

American Association of Oilwell Drilling Contractors, annual meeting, Mayo Hotel, Tulsa, October 9-10.

Petroleum Branch, American Institute of Mining and Metallurgical Engineers, West Coast meeting, Elks Club, Los Angeles, October 12-13.

Permian Basin Oil Show, Odessa, Tex., October 19-22.

Independent Natural Gas Association of America, annual meeting, Shamrock Hotel, Houston, October 23.

November

Mid-Continent Oil and Gas Association, Louisiana-Arkansas Division, annual meeting, Roosevelt Hotel, New Orleans, November 2-3.

American Petroleum Institute, annual meeting, Biltmore and Ambassador Hotels, Los Angeles, November 13-16.

American Society of Mechanical Engineers, Hotel Statler, New York, November 26-December 1.

December

American Institute of Chemical Engineers, annual meeting, Columbus, Ohio, December 3-6.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

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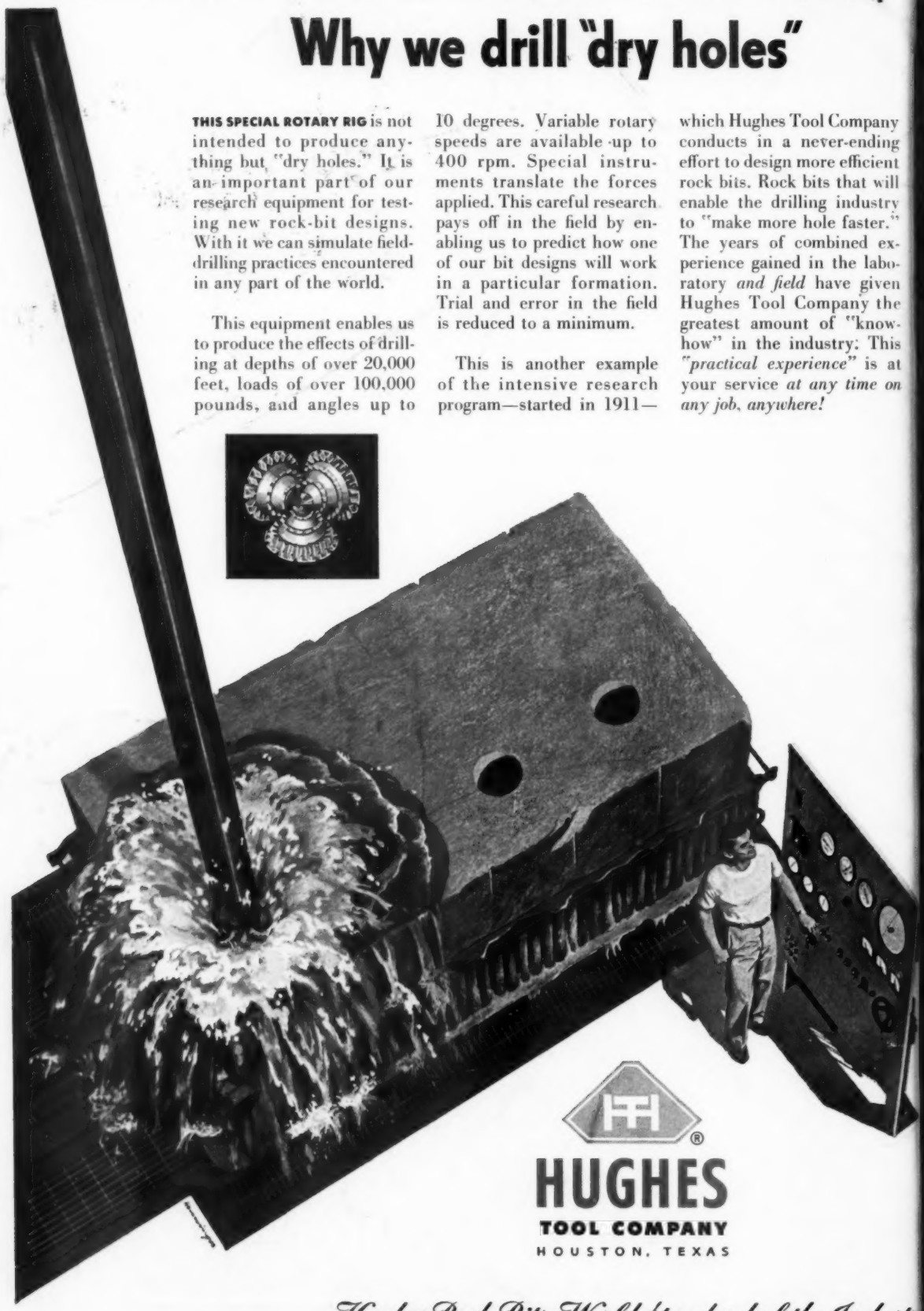

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